Selected Results of the "Methods for the Epidemiology of Child and Adolescent Mental Disorders" Study

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PREFACE

The work reported in this dissertation commenced when I worked for a two-year period at the New York State Psychiatric Institute (NYSPI) and Columbia University in the City of New York. It consists of three sub-projects, each of which drew on the data set from the National Institute of Mental Health (NIMH) Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) Study. Each of the three sub-projects has been published in the form of a paper in a scientific journal, details of which are provided below:3

1. Flisher AJ, Kramer RA, Hoven CW, King RA, Bird HR, Davies M, Gould MS, Greenwald S, Lahey BB, Regier DA, Schwab-Stone M, Shaffer D (2000), Risk behavior in a community sample of children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* 39:881-887.

2. Flisher AJ, Kramer RA, Grosser RC, Alegria M, Goodman SH, Greenwald S, Horwitz SM, Moore RE, Narrow WE, Hoven CW (1997), Correlates of unmet need for mental health services by children and adolescents. *Psychological Medicine* 27:1145-1154.

3. Flisher AJ, Kramer RA, Hoven CW, Greenwald S, Alegria M, Bird HR, Canino G, Connell R, Moore RE (1997), Psychosocial characteristics of physically abused children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* 36:123-131.

Although each paper had a number of authors, I was primarily responsible for the conceptualisation, design and write-up of each paper.

The sub-projects are linked in that each addresses scientific questions in a manner that exploits the methodological strengths of the MECA Study, such as the fact that the samples were community based; data were available from both the youth and their caretakers; and a state-of-the-art diagnostic instrument, the Diagnostic Interview Schedule for Children (Version 2.3), was used to establish a diagnosis.

I am extremely grateful to colleagues in New York who facilitated this work. These included Dr David Shaffer, who graciously hosted me in his department the NYSPI and Columbia University, and provided key intellectual contributions at critical stages. Dr Christina Hoven and her team at the "Westchester Study" provided a stimulating and supportive work environment. Dr Rachel Kramer provided statistical and epidemiological advice and (with the assistance of Mr Steven Greenwald) performed the statistical computations. Dr René Grosser introduced me to many exciting developments in the field of mental health services research. Other colleagues who contributed directly to the work reported in this dissertation included Drs Hector Bird, Madelyn Gould and Robert Moore, Ms Roxanne Connell and Mr Mark Davies from the NYSPI and Columbia University; Dr Sherryl Goodman from Emory University; Drs Sarah Horwitz, Robert King and Mary Schwab-Stone from Yale University; Drs Margarita Alegria and Glorisa Canino from the University of Puerto Rico; Dr Ben Lahey from the University of Chicago; and Drs Bill Narrow and Darrel Regier and Ms Karen Bourdon from the NIMH. I am also grateful to other scientists that were responsible for the

MECA Project whose names are listed in the MECA Study "plate" below; clearly, without their efforts the work reported in this dissertation would not have been able to take place.

In Cape Town, Professor Brian Robertson agreed to take on the role of supervisor for this dissertation, despite a very heavy workload. I am grateful for this, especially as this was the third time he has agreed to supervise me. I promise that this will be my last request of this nature. I also appreciate the ongoing support he provides for my research activities and my professional development in general.

The work reported in this dissertation was partially supported by my receiving a Young Investigator Award from the National Alliance for Research on Schizophrenia and Depression (U.S.A.), a grant from the American Foundation for Suicide Prevention, and a Postdoctoral Overseas Scholarship from the South African Medical Research Council. Additional support was provided by Research Grants MH-46091 to Dr Hoven and MH38198-05A2 to Dr Shaffer, and Research Training Grant T32 MH16434 and Center Grant MH43878-A1 to Dr Shaffer, all from the National Institute of Mental Health (U.S.A.).

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ABSTRACT

Aims

(1) *(i)* To investigate whether there is covariation between risk behaviors, including suicidality, in a community probability sample of children and adolescents and *(ii)* to document whether involvement in such risk behaviors is associated with variables grounded in a modified version of Hurrelmann's theory.
(2) To document the extent and correlates of unmet need for mental health services in community samples of children and adolescents.
(3) To examine the association between physical abuse and selected psychosocial measures.

Methods

The sample consisted of 1,285 9 to 17 year-old youth and their caretakers from four sites in the USA. Fieldworkers interviewed the youth and their caretakers at their homes.

Results

(1) There were significant relationships between all possible pairs of the following risk behaviors: cannabis smoking, alcohol misuse, intercourse, fighting, cigarette smoking, and suicidal ideation/attempts. In a regression model including all the potential correlates, risk behavior was associated with life events, poor school grades, reduced social competence, reduced parental monitoring, mood and disruptive disorder, and functional impairment.
(2) Of the total sample, 17.1% had unmet need, defined as the presence of psychopathology and functional impairment in the absence of mental health service use in the previous six months. Adjusting for demographic variables, logistic regression analyses revealed that unmet need was significantly associated with indicators of economic disadvantage; parental psychopathology; poor school grades; and parent-reported access barriers. No youth-reported access barriers were significantly associated with unmet need.
(3) A history of physical abuse was reported in 25.9% of the sample. Such a history was significantly associated with global impairment, poor social competence, major depression, conduct disorder, oppositional defiant disorder, agoraphobia, overanxious disorder, and generalised anxiety disorder but not with suicidality, school grades, or receptive language ability.

Conclusions

(1) Clinicians should be alerted to the possibility of risk behaviors, especially in children and adolescents engaging in other risk behaviors and those with inadequate resources, stressors, functional impairment or psychopathology.
(2) The economic correlates of unmet need may attain increased importance in the light of current reform in health care financing in the USA. Access may be facilitated by increasing parental knowledge of mental health services and enabling children and adolescents to initiate contact with services independently of their families.
(3) The results support comprehensive screening for psychopathology among physically abused children and for physical abuse among those with psychopathology. Interventions aimed at improving social competence are indicated.

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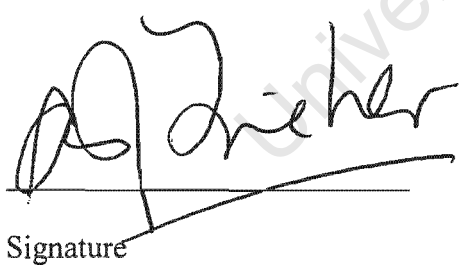
MECA STUDY "PLATE"

The MECA program is an epidemiologic methodology study performed by 4 independent research teams with the staff of the Division of Clinical Research, which was reorganized in 1992 with components now in the Division of Epidemiology and Services Research and the Division of Clinical and Treatment Research, of the NIMH, Rockville, MD. The NIMH Principal Collaborators are Darrel A. Regier, M.D., M.P.H., Ben Z. Locke, M.S.P.H., Peter S. Jansen, M.D., William E. Narrow, M.D., M.P.H., Donald S. Rae, M.A., John E. Richters, Ph.D., Karen H. Bourdon, M.A., and Margaret T. Roper, M.S. The NIMH project officer was William J. Huber. The Principal Investigators and Co-investigators from the 4 sites are as follows: Emory University, Atlanta, Georgia, U01 MH46725: Mina K. Dulcan, M.D., Benjamin B. Lahey, Ph.D., Donna J. Brogan, Ph.D., Sherryl H. Goodman, Ph.D., and Elaine W. Flagg, Ph.D.; Research Foundation for Mental Hygiene at New York State Psychiatric Institute (Columbia University), New York, NY, U01 MH46718: Hector R. Bird, M.D., David Shaffer, M.D., Myrna Weissman, Ph.D., Patricia Cohen, Ph.D., Denise Kandel, Ph.D., Christina Hoven, Dr.P.H., Mark Davies, M.P.H., Madelyn Gould, Ph.D., and Agnes Whitaker, M.D.; Yale University, New Haven, CT, U01 MH46717: Mary Schwab-Stone, M.D., Philip J. Leaf, Ph.D., Sarah M. Horwitz, Ph.D., and Judith H. Lichtman, Ph.D.; University of Puerto Rico, San Juan, Puerto Rico, U01 MH46732: Glorisa Canino, Ph.D., Maritza Rubio-Stipec, M.A., Milagros Bravo, Ph.D., Margarita Alegria, Ph.D., Julio Ribera, Ph.D., Sara Huertas, M.D., Michael Woodbury, M.D., and Jose Bauermeister, Ph.D.

DECLARATION

I, Alan John Flisher, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise), and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

I empower the University of Cape Town to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever, subject to the agreement of the publishers of the journals listed in the preface in which aspects of the dissertation have appeared.



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Chapter 1
Introduction

1. INTRODUCTION

1.1 Sub-study 1

Risk behavior can be defined as behaviour that places the individual at risk for adverse psychological, social or physical consequences. There is an impressive body of evidence supporting the existence of covariation between various risk behaviors of children and adolescents, both in the USA and elsewhere (Hidalgo *et al.*, 2000; Jessor, 1991; Jessor and Jessor, 1977; Wallace *et al.*, 1997). However, the overwhelming majority of these studies had sampling frames limited to school students. Exceptions include studies by Fullilove *et al.* (1993) and Zastowny *et al.* (1993), in which samples were recruited through street-based/network strategies and at central urban locations respectively. However, these sampling strategies do not generate samples that are representative of the populations from which they are drawn. Sylbing and Persoon (1985) employed a community probability sample of Dutch youth, but confined their attention to substance use. Hingson *et al.* (1990) used random digit dialing to obtain their sample of 1,733 Massachusetts teenagers. They found significant relationships between having unprotected sexual intercourse and use of various substances, but they did not address covariation between other risk behaviors.

There is thus a dearth of studies with community probability samples in which the presence of covariation between risk behaviors in children and adolescents has been demonstrated. Studies with community probability samples would amplify the robustness of the covariation. One cannot assume that covariation present in school-based studies is also be present in community-based studies, for at least two reasons. First, aspects of the social ecology of the school, for example opportunities to engage in more than one risk behavior simultaneously with a group of students, may cause the covariation (Andrews, 1985). Such factors may not be operating for absentees or dropouts. Second, there is evidence that the risk behavior of school absentees or dropouts differs from those attending school (Chavez *et al.*, 1989; Eggert *et al.*, 1990; Flisher and Chalton, 1995; McKirnan and Johnson, 1986; Pirie *et al.*, 1988). The general conclusion is that prevalence rates of risk behavior are higher among dropouts or absentees. However, this is not necessarily the case; one study, for example, found that the rates of suicidal ideation were significantly higher among girls attending school than dropouts (Flisher and Chalton, 1995). It is possible that a behavior with a lower prevalence rate among school students would indeed covary with the other risk behaviors among school-based samples, but not among other samples.

There is at present only limited support for including suicidality in the covariation. Significant relationships have been detected between suicidality and violent behavior, substance use, and participating in sexual intercourse (Flisher *et al.*, 1996; Garrison *et al.*, 1993; Orpinas *et al.*, 1995; Sosin *et al.*, 1995; Walter *et al.*, 1995; Windle *et al.*, 1992). However, most of these studies limited their attention to a subset of risk behaviors, and

all had school-based samples. Although King *et al.* (2001) found significant relationships between suicidality and other risk behaviors in a community probability sample of children and adolescents, they did not address the question of whether these other risk behaviors are associated with each other.

It is thus necessary to investigate whether there is covariation between adolescent risk behaviors, including suicidality, in a community probability sample of children and adolescents. If this were indeed the case, it would be meaningful to document the correlates of such a cluster of risk behaviors. Such correlates may be organised in a theoretical framework, such as the synthesis model that has been proposed by Hurrelmann (1989). This model is suitable for the present purposes as the MECA data set has sufficient relevant variables for this framework to be meaningfully employed.

According to Hurrelmann (1989), whether a risk behavior is necessary to fulfill social functions depends on the presence of sufficient resources to cope with stressors. There are two possible consequences of a perceived discrepancy between the available resources and the behavioral demands associated with stressors (Sieving *et al.*, 1997). On the one hand, the discrepancy could serve as a spur for healthy personality development. This would occur if the person takes appropriate steps to develop the required resources. On the other hand, it could serve to promote the development of an "unhealthy" identity. One aspect of this could be risk behavior, which may be mobilized to reduce the discomfort caused by the discrepancy. These two consequences are exemplified by an adolescent girl experiencing anxiety while exposed to peer pressure to use cannabis for

the first time. She may implement assertiveness strategies, which (if successful) could increase self esteem and thus contribute to a healthy development trajectory. Conversely, if she is unable to call upon such a personal resource, she may choose to terminate the social anxiety by submitting to the peer pressure to smoke the cannabis.

Hurrelmann (1989) includes biological disposition as one of the factors influencing whether the person will be able to respond adequately to stressors. Two aspects of biological predisposition are family psychiatric history and perinatal problems. The former may influence psychosocial well-being by various pathways besides genetic transmission, such as through its impact on the ability of parents to respond appropriately to their children. The latter has been shown to be associated with risk behaviors, such as suicidality (Salk *et al.*, 1985), behavior problems (Grigoroiu-Servanescu, 1984), and homicide (Raine *et al.*, 1994). No studies concerning the relationship between perinatal pathology and other adolescent risk behaviors were able to be located. However, the evidence that perinatal pathology is associated with three risk behaviors is compatible with Hurrelmann's theory.

Psychopathology was *not* included in Hurrelmann's (1989) model. However, psychopathology may reduce the capacity of the adolescent to respond adequately to stressors, thus increasing the likelihood of risk behavior. Indeed, it has been shown to be a risk factor for behavior such as unsafe sexual practices (Donenberg et al., 2001; Stiffman *et al.*, 1992), substance use (Deykin *et al.*, 1987; Kandel and Davies, 1982), and suicidality (Flisher, 1999). A crucial concomitant of psychopathology is functional

impairment. Consensus is growing that diagnoses should be assigned only when functional impairment is present. Although Hurrelmann (1989) did not include functional impairment in his theory, one might expect that this concomitant of psychopathology would accompany or mirror reduced resources to cope with stressors, and would thus be correlated with risk behavior.

For Sub-study 1 of this dissertation, the hypotheses are that, for a community probability sample of children and adolescents in the USA, (1) there is covariation between risk behaviors (including suicidality); and (2) involvement in such risk behaviors is associated with variables grounded in a modified version of Hurrelmann's theory, namely that risk behavior is associated with increased stressors, reduced resources to cope with these stressors, biological predisposition, and psychopathology (including functional impairment).

1.2 Sub-Study 2

According to the Needs for Care Assessment Methodology of the Medical Research Council (MRC), need for mental health services is defined to exist when: (a) there is functional impairment, that is the level of functioning falls below, or threatens to fall below, some minimum specified level, *and* (b) this is due to some potentially remediable or preventable cause, for example psychopathology for which there is effective and acceptable treatment (Bebbington, 1992; Bebbington *et al.*, 1996; Brewin *et al.*, 1987). If need is present, it can be characterised as *met need* or *unmet need*, depending on whether

the necessary services are being provided. *Overprovision* refers to the provision of services in the absence of need (Brewin and Wing, 1993). Given that the prevalence of psychopathology in children and adolescents in the USA is approximately 20% according to recent reviews (Bird, 1996; Canino *et al.*, 1995; Cohen *et al.*, 1996) and that only a small proportion of these receive mental health services (Friedman, 1996; Wu *et al.*, 1999), it is reasonable to suppose that there is a considerable amount of unmet need for mental health services among children and adolescents.

The identification of factors distinguishing those with unmet need for mental health services from the rest of the population may suggest how the extent of unmet need can be reduced. In the first study systematically addressing this question, Shepherd *et al.* (1966, 1971) compared a group of 50 children attending child guidance clinics in Buckinghamshire with a group of matched children who had never attended such a clinic. They concluded that the severity of behavioural disturbance was not significantly associated with referral. However, parental reactions to their children's behaviour and the occupational class of the father were significantly associated with referral (Shepherd *et al.*, 1966, 1971). There is support from more recent studies that potential correlates of unmet need may include: (a) demographic features - gender, age, race/ethnicity, place of residence (Garland and Besinger, 1997; Hoberman, 1992; Wu *et al.*, 2001; Zahner and Daskalakis, 1997); (b) economic factors - family income, access to health insurance (Pavuluri *et al.*, 1996); (c) family factors - parental psychopathology, maternal educational level, family structure (Costello *et al.*, 1997; Jensen *et al*, 1990); (d) academic factors - school grades; (e) perceptions of mental health status and usefulness

of mental health services (Angold *et al.*, 1998; Hornblow *et al.*, 1990: Wu *et al.*, 1999, 2001); and (f) barriers to access of mental health services (Pavuluri *et al.*, 1996; Wu *et al.*, 2001). These variables may be associated with unmet need through their association with one or more of the components of need as defined by the Needs for Care Assessment Methodology of the MRC, *viz.* functional impairment, psychopathology, and service use history (Brewin *et al.*, 1987).

Data from the MECA study formed the basis of two previous analyses addressing aspects of service use by children and adolescents (Goodman et al., 1997; Leaf et al., 1996). However, unlike the present study, neither Goodman et al. (1997) nor Leaf et al. (1996) employed the categories of need status as defined by the MRC's Needs for Care Assessment (no need, overprovision, met need, and unmet need) (Brewin et al., 1987). These categories were used as they have immediate implications in terms of policy and planning for mental health services for children and adolescents. It should be noted that although the present study draws on the Needs for Care Assessment as regards these categories of need status, there are aspects of the Needs for Care Assessment that are not included in the present study. These include instrumentation that operationalises and measures need in diverse functional domains (Brewin *et al.,* 1987) . Also, there is no way of demonstrating that the unmet need arises from a potentially remediable or preventable cause, for example psychopathology for which there is effective and acceptable treatment (Brewin *et al,* 1987). Thus, there may a small group of children and adolescents that had unmet need (in that they were suffering from psychopathology, were functionally impaired and were not using mental health services) but their condition was not

potentially remediable. Despite these issues, the categories were used as they have immediate implications in terms of policy and planning for mental health services for children and adolescents.

Leaf *et al.* (1996) described service use by the children and adolescents comprising the MECA sample. Among his findings were that 25.3% of those with a diagnosis and who were rated as functionally impaired had received mental health services from a speciality mental health provider (psychiatrist, psychologist, social worker, or counselor) in the previous year. They did not attempt to identify factors distinguishing those who had received mental health services from the rest of the sample. Goodman *et al.* (1997) compared youth who met criteria for a mental disorder who had received outpatient mental health services with those who had not received these services. Even after controlling for global functional impairment, they found that those receiving services were not representative of all youth with mental disorders in that they were more likely to have had a police contact, to have been suspended or expelled from school, to have engaged in suicidal behaviour, and to be rated as low in social competence. However, they confined their attention to those with mental disorder, and they did not compare those with unmet need with the remainder of the sample. From the perspective of population-based public mental health strategies, this latter comparison is integral in distinguishing those with unmet need from the rest of the population. It is necessary to distinguish this group from the general population of children and adolescents so that services can be provided, thus reducing the extent of unmet need. For this purpose, it is

of secondary importance whether the absence of unmet need is due, for example, to an absence of psychopathology or the utilisation of the appropriate services.

Sub-study 2 in this dissertation aimed to extend previous findings by: (a) describing the sample of the MECA study in terms of the categories of need status as defined by the MRC's Needs for Care Assessment; and (b) documenting the correlates of unmet need for mental health services.

1.3 Sub-study 3

A major advance in the past three decades has been the increased recognition of the prevalence of physical abuse of children and adolescents. This has been paralleled by a growing appreciation of the associated adverse consequences. Several recent review articles in which these consequences are addressed attest to the maturity attained by the field (Cicchetti and Toth, 1995, 2000; Knutson, 1995; Kolko, 1992; Malinosky-Rummell and Hansen, 1993, National Research Council, 1993; Skuse and Bentovirn, 1994).

These reviews cite a substantial body of empirical support for a correlation between a history of physical abuse and psychopathology in childhood and adolescence. Dodge *et al.* (1990) reported a multisite longitudinal study involving a cohort of non-referred children, some of whom had been physically abused, which concluded that physical abuse is a risk factor for the development of chronic aggressive behavior. In another longitudinal study, Boney-McCoy and Finkelhor (1995) conducted telephone interviews

with a national, random sample of youths aged 10 to 16 years. They concluded that, controlling for prior psychopathology and the quality of the parent-child relationship, parental violence was associated with symptoms of posttraumatic stress disorder and depression, while assault by non-family perpetrators was associated only with the former (Boney-McCoy and Finkelhor, 1996). Finally, Brown *et al.* (2000) reported on a cohort of 776 randomly selected children who were studied from a mean age of 5 years to adulthood during a 17-year period. They found that adolescents or adults with a history of childhood maltreatment were 3 times more likely to become depressed or suicidal compared with individuals without such a history.

However, the remaining studies addressing the relationship between physical abuse and psychopathology have generally had single-site samples selected from those receiving residential psychiatric treatment (Kazdin *et al.*, 1985; Scerbo and Kolko, 1995), attendees at clinics or agencies for victims of physical abuse (Allen and Tarnowski, 1989; Kaufman, 1991; Macfie *et al.*, 2001), or children labeled abused by judicial processes (Famularo *et al.*, 1992; Horwitz *et al.*, 2001; Kaplan *et al.*, 1999; Kinard, 1995). Those whose abuse has been recognized comprise a small proportion of all abused children and the effects of the abuse may be confounded by the sequelae of disclosure, such as separation from parents, foster home placement, and labeling of the victims and their families (Dodge *et al.*, 1990).

Suicidality can occur in conjunction with several psychiatric conditions (Andrews and Lewinsohn, 1992), and there is evidence from clinic-based (Deykin *et al.*, 1985; Finzi *et*

al., 2001; Shaunesey *et al.*, 1993; Stone, 1993) and community-based (Bensley *et al.*, 1999) research that physical abuse is associated with suicide attempts and/or ideation in childhood or adolescence. However, Spirito *et al.* (1987) compared adolescents hospitalized after a suicide attempt with a control group of adolescent inpatients referred for psychiatric evaluation and detected no differences in terms of a history of physical abuse. These contrary findings may also be due to unrepresentative samples.

In contrast to suicidality, global functional impairment is a nonspecific characteristic of psychopathology (Bird *et al.*, 1993). To the extent that psychopathology may be associated with physical abuse, one would expect that physical abuse would be associated with global functional impairment. However, this has not been subject to empirical confirmation.

One aspect of functional impairment that has received research attention is interpersonal relationships. Although there is compelling evidence that physically abused children have difficulties with peer relationships (Bolger and Patterson, 2001; Salzinger *et al.*, 1993), there is a divergence of findings regarding the relationship between a history of physical abuse and social competence per se (Kinard, 1999; Levendosky *et al.*, 1995; Manly *et al.*, 1994). Malinosky-Rummell and Hansen (1993) suggest that this lack of consensus may he accounted for by different definitions of social competence and failure to control for relevant family variables. In addition, the relevant studies base their conclusions on samples that are small and unrepresentative of physically abused children in the community.

Impairment can also be manifest in the academic sphere, for example by poor school grades. A plethora of studies, most of which did not control for possible confounding variables such as social class, have documented academic deficits among physically abused children (Eckenrode *et al.*, 1993; Zolotor *et al.*, 1999). Again, there are inconsistent findings (Vondra *et al.*, 1989). In one study with a large sample (N = 420), a control group, specification of type of abuse, and statistical control for social class, age, and gender, Eckenrode *et al.* (1993) found that children who had been neglected and/or physically abused obtained grades that were significantly lower than those of their peers. Additional analysis revealed that those who had been abused but not neglected did not achieve lower grades. None of the studies addressing this issue used community probability samples.

Finally, academic achievement is intimately allied with intellectual functioning, especially receptive language ability. Several studies with control groups matched for demographic and socioeconomic variables have reported that identified physically abused children obtained relatively low scores on the Peabody Picture Vocabulary Test (PPVT), a test of receptive language ability. This was valid for studies with samples ranging from small groups of young children (Hoffman-Plotkin and Twentyman, 1984; Vondra *et al.*, 1990) to a group of 413 individuals abused in childhood who were assessed at approximately 28 years of age (Perez and Widom, 1994). Despite this consensus, the lack of community-based studies involving older children renders further investigation necessary.

As implied above, there are several variables that may confound the associations between exposure to physical abuse and one or more psychosocial characteristic(s). Besides demographic features, these include (1) family environment (Barnow *et al.*, 2001; Goodyer, 1990; Paavilainen et al., 2001; Skuse and Bentovim, 1994); (2) family psychiatric history (Simonoff *et al.*, 1994; Skuse and Bentoyim, 1994); (3) perinatal problems (Breslau, 1995; Skuse and Ben- tovim, 1994); (4) current physical health (Breslau, 1985; Skuse and Bentovim, 1994); and (5) a history of sexual abuse (Knutson, 1995).

In Sub-study 3 of this dissertation, the aim is to document the associations between a history of physical abuse and various psychosocial characteristics. The MECA study provides the opportunity to do this with a community probability sample, using standardized instruments and controlling for potential confounding variables (Lahey *et al.*, 1996). The hypothesis is that a history of physical abuse is associated with (1) the presence of one or more psychiatric diagnoses; (2) suicidality; (3) global functional impairment; (4) poor social competence; (5) low school grades; and (6) poor receptive language ability. If this hypothesis is confirmed, it would provide additional evidence that these characteristics are present in children and adolescents in the community who have been physically abused.

Chapter 2
Method

2. METHOD

2.1 Sample

The sample was drawn from four geographic areas in the United States: Hamden, East Haven and West Haven, Connecticut; DeKalb, Rockdale and Henry Counties, Georgia; Westchester County, New York; and San Juan, Puerto Rico. The target population included all youth aged from 9 to 17 years residing in a housing unit within the geographic study at the time of enumeration. Youth residing in any type of institution were excluded from the survey. Youth and their caretakers were excluded from the study if their primary language was not English or Spanish in Connecticut and New York, or not English in Georgia. There were no language exclusions in Puerto Rico (where all the interviews were conducted in Spanish).

All children and adolescents in the age range who had lived in the household at least half the time during the previous six months were eligible for participation in the study. Where there was more than one eligible youth residing in the household, the subject for the study was randomly selected from those eligible.

The sample housing units (SHU's) were visited to enumerate the eligible youths residing in each SHU. The sampling strategies varied by site. However, in each case a multistage cluster procedure was followed (see Lahey et al., 1996, for further details). The sampling housing unit (SHU) enumeration response rate and interview response rate for each site are provided in Table 1.

The total sample consisted of 1,285 children and adolescents (604 boys and 681 girls) aged 9 through 17 years (mean = 12.9 years; standard deviation = 2.6 years). The adult informant was selected from a hierarchy of possible respondents; for 90% of sample, the adult informant was the biological mother. Further details of the sample are provided in Table 2.

For Sub-studies 1 and 2, the entire sample was used. However, for Sub-study 3, only the New York and Puerto Rico sites were used because these are the only sites at which data regarding physical abuse were obtained.

TABLE 1

Sampling housing unit (SHU) enumeration response rate and interview response rate by site*

	New Haven, Connecticut	Atlanta, Georgia	Westchester County, New York	Metropolitan San Juan, Puerto Rico
Total number of enumerated SHU's	2,965	1,444	2,017	1,011
SHU enumeration response rate	0.999	0.998	0.999	0.998
Percentage of SHU's with ≥ 1 eligible youth	14	27	20	32
No. of eligible youth-caretaker pairs	426	354	418	325
No. of youth-caretaker pairs interviewed	314	299	360	312
Interview response rate (%)	74	84	86	96

* From Lahey et al., 1996

TABLE 2

Sex and ethnicity of interviewed youths and household income distribution for youth-adult pairs, by site*

	New Haven, Connecticut		Atlanta, Georgia		Westchester County, New York		Metropolitan San Juan, Puerto Rico	
	N	%	*n*	%	*n*	%	*n*	%
Sex of interviewed youths								
Male	177	56	155	52	182	51	167	54
Female	137	44	144	48	178	49	145	46
Ethnicity of interviewed youths								
Non-Hispanic white	245	78	190	64	225	63	0	0
African-American	34	11	91	30	65	18	0	0
Hispanic	12	4	4	1	36	10	312	100
Other	23	7	14	5	34	10	0	0
Household income of interviewed youth-adult pairs								
< $10,000	17	5	12	4	27	8	139	44
$10,000 - $24,999	43	14	38	13	54	15	89	29
$25,000 - $64,999	181	58	183	61	101	28	68	22
$65,000 - $99,000	61	19	57	19	88	24	13	4
> $100,000	9	3	8	3	80	22	1	0.3
Missing or refused	3	1	1	0.3	10	3	2	1

* From Lahey et al., 1996

It is not possible to ascertain the extent to which the samples are representative of the communities from which they were drawn as the population data are not available. However, SHU enumeration response rates, the interview response rates and the multistage sampling procedures give grounds for optimism in this regard.

The slightly higher proportion of interviewed males (53%) is consistent with the percentage of males aged 10 to 19 years in the United States in 1992 (US Bureau of the Census, 1994). This suggests that the sample is not biased in terms of sex in relation to the US population. However, the sample is not representative in terms of ethnicity. In the three mainland sites, the proportion of non-Hispanic white youths in the sample (68%) is lower than that for the United States in 1992 (81%)(US Bureau of the Census, 1994). The proportion of African American youth in the sample (20%) is higher than that for the United States in 1992 (US Bureau of the Census, 1994). It is not possible to compare the other ethnic groups because of differences in the definitions of the groups. Furthermore, the sample is not representative in terms of median family incomes. At all four sites the income was higher among the families represented in the sample than for the regions in which they are situated (US Bureau of the Census, 1994).

These differences indicate that one should exercise caution in extrapolating the results from the MECA study to the population of the United States. Such caution is in any case necessary as no attempt was made to draw a sample that was representative of any population outside the specific geographic areas from which the sample was drawn.

2.2 Measures

In general, I will not address psychometric proporties of the instruments such as reliability (besides internal consistency) and validity. Many of these aspects are addressed in detail in a paper by Goodman et al. (1998) that focuses specifically on the instruments used in the MECA project.

2.2.1 Sub-study 1

Risk behaviors

Participation in each of the risk behaviors was defined by the youth's account of whether they had ever smoked marijuana; had become drunk in the previous six months; had ever had any sexual experience or been sexually active; had been involved in any serious physical fights where there was punching or kicking in the previous year; had had any suicidal ideation or made any suicidal attempts in the previous six months; and were currently smoking more than one cigarette per day.

The following variables correspond to the domain of stressors in Hurrelmann's (1989) theory:

Life events

This referred to the child's report of the number of life events that he/she had experienced in the previous 12 months.

Family environment.

This was assessed using the "Family Apgar" which was completed by the adult informant (Del Vecchio *et al.*, 1979; Good *et al.*, 1979). There are five items, each of which refers to an aspect of family relationships such as support, use of leisure time, and communication. Scores range from 1 (almost always) to 3 (hardly ever). Low scores indicate a more accepting environment. The α coefficient was 0.83 (Goodman *et al.*, 1998).

Marital adjustment

These questions were asked only of a primary caretaker living with a spouse/partner, or a primary caretaker who is a biological parent and has regular contact with the other biological parent who does not live in the household. There are four items, such as "agree on aims, goals, things important" and "how often calmly discusses something". The scores range from 0 to 6, with low scores indicating greater marital discord.

Marital quarreling

Adult informants were asked how often they quarrel with their partner and, if they ever hit each other while quarreling, how often they do so. Scores ranged from 1 (one or more times per day) to 6 (less than once per month).

Discipline

The adult respondents were asked how often the youth's primary caretaker uses each of six forms of nonphysical discipline (for example, acting in a cold/unfriendly manner, taking away privileges) and two forms of physical discipline (for example, spanking or slapping). Responses range from 1 (never/almost never) to 4 (very often). The alpha scores were 0.70 and 0.71 for nonphysical and physical discipline respectively (Goodman *et al.*, 1998).

School grades

These were estimated from the youth's report of a summary of their grades on their last report card on a scale ranging from 1 (mostly A's) to 7 (mostly D's or below). There was no independent verification of the youths' summary of their grades.

Pubertal status

This was measured by the youth's self-report on the Pubertal Development Scale (Petersen *et al.*, 1988). They indicated on a paper form whether there had been no development, development had barely begun, development was definitely under way, or development was completed, on each of five characteristics. The characteristics were growth spurt in height, pubic hair, and skin change for both girls and boys; facial hair and voice change in boys only; and breast development and menarche in girls only. With the exception of menarche, each item is coded on a four-level ordinal scale. The internal consistency of the instrument in the present sample was 0.81 for girls and 0.82 for boys (Goodman *et al.*, 1998). A youth was

characterized as pubertal if they were in early, mid, or late puberty compared to not pubertal (pre- or post-pubertal).

Current physical health

Both the adult informant and the youth were asked to rate the youth's physical health on a scale from 1 (excellent) to 5 (very poor). The mean of these two assessments was used to characterize the physical health of the youth.

The following variables correspond to the domain of resources in Hurrelmann's (1989) theory:

Social and instrumental competence

These were assessed from the relevant sub-scales of the Instrumental and Social Competence Scale (Beiser *et al.*, 1993). For social competence, there were 12 and 9 items in the parent and youth versions respectively. Examples include "responds well to humor of others" (parent version) and "I enjoy being with other people" (youth version). For instrumental competence, there were 13 items in each version. Examples include "child is dependable" (parent version) and "I am good at my schoolwork" (youth version). All items are scored from 1 (not true) to 4 (often or very true). The scores for social and instrumental competence were obtained by taking the mean of the parent and youth reports. As regards internal consistency, the α coefficients were 0.79 or higher for each sub-scale for each informant (Goodman *et al.*, 1998).

Verbal intelligence/receptive language ability

Stanine scores from the Peabody Picture Vocabulary Test-Revised (PPVT-R) were used to assess this construct (Dunn and Dunn, 1981). The Spanish PPVT was used with respondents whose dominant language was Spanish. The instrument has been standardized, and there are published norms for Puerto Rican populations (Dunn *et al.*, 1986).

Parental monitoring

The mean of the parent and youth scores on the Parental Monitoring Scale was used to assess this construct. This scale consists of five questions about the extent to which the youth's primary caretaker monitors the behavior of the youth, such as how often the child leaves without telling the caretaker. Scores range from 1 (never/almost never) to 4 (very often). As regards internal consistency, the α coefficient for the parent version and youth versions were 0.59 and 0.63 respectively (Goodman *et al.*, 1998).

Social class

This was estimated from whether the caretaker received any income from public assistance or not.

Biological predisposition was assessed by family psychiatric history and perinatal problems:

Family psychiatric history

The adult informant's report of specific psychiatric symptoms in either biological parent, as assessed by the Family History Epidemiologic (FHE) (Lish *et al.*, 1995), indicated a positive family history of psychopathology.

Perinatal problems

These were defined as being present if the adult informant indicated that the birth weight was under 5 pounds, there was prematurity of three weeks or more, or the duration of the hospital stay was more than one week after delivery.

Finally, psychopathology was assessed by psychiatric diagnosis and impairment:

Psychiatric diagnosis

The Youth and Parent Versions of the Diagnostic Interview Schedule for Children, Version 2.3 (DISC-2.3) were used to produce current (within 6 months) diagnoses, according to the Diagnostic and Statistical Manual for Mental Disorders, Third Edition, Revised (DSM-III-R) (American Psychiatric Association, 1987; Shaffer *et al.*, 1996). A criterion was considered met if reported present by either the parent or the child (Shaffer *et al.*, 1996).

For a diagnosis to be assigned, in addition to meeting DSM-III-R symptom, onset and duration criteria, it was necessary for both of the following criteria to be met: (1) the presence of at least two of the three to five diagnosis-specific items indicating personal distress or

social or academic difficulties resulting from the symptoms of each diagnosis, reported by either or both informants, and (2) a score of ≤ 70 on the Children's Global Assessment Scale (CGAS)(Shaffer *et al.*, 1983), as assessed by the parent. A score of ≤ 70 was suggested by Shaffer *et al.* (1996) in defining caseness among the same sample of children participating in the present study. The CGAS is an adaptation of the Global Assessment Scale for Adults (Endicott *et al.*, 1976), and reflects the lowest level of functioning during the previous six months. The range of scores is 1 (most impaired) to 100 (least impaired).

The DISC-2.3 is organised into 19 diagnostic schedules, grouped into six diagnostic modules. The diagnostic modules are as follows: anxiety disorders (for example, simple phobia, separation anxiety disorder, obsessive compulsive disorder), mood disorders (major depressive episode, dysthymia, mania, hypomania), disruptive behaviour disorders (attention deficit hyperactivity disorder, oppositional defiant disorder, conduct disorder), substance abuse disorders (for example, alcohol and marijuana abuse), psychotic disorders (consisting of a screen only), and miscellaneous disorders (for example, anorexia nervosa, nocturnal enuresis, Tourette's Syndrome) (Shaffer *et al.*, 1996). For the present sub-study, the superordinate diagnostic category of mood, anxiety or disruptive disorder only was assigned if the child satisfied the criteria for any disorder in that category. Suicide items were omitted as criteria for the mood disorders to avoid artificially inflating the relationship between these disorders and suicidality.

The criterion validity of the DISC-2.3 was examined for 247 of the parent-youth pairs participating in the MECA Study (Schwab-Stone *et al.*, 1996). Subjects who had a positive DISC diagnosis using a lay-administered DISC on any of the diagnostic areas under

investigation and a comparable number of "screen negatives" were included in the validation study. Clinicians re-interviewed both the youth and the parent using the DISC followed by a clinical-style interview on the basis of which they rated the presence of symptoms and impairment. In the clinical-style interview, there was inquiry about each item for which there was clinical doubt about the veracity of the response or which had been scored positively. The latter items were selected because of concerns about false positives on earlier versions of the DISC. Computer algorithms combined this information into diagnoses. The results indicated that the DISC has moderate to good validity across a number of diagnoses (Schwab-Stone *et al.*, 1996).

Impairment.

This was assessed by the score assigned by the adult informant on the Columbia Impairment Scale (CIS)(Bird *et al.*, 1993). There are 13 items in the following major areas of functioning: (1) interpersonal relations; (2) broad psychopathological domains; (3) functioning in job or school; and (4) use of leisure time. Each item is scored on a range from 0 (no problem) to 4 (a very bad problem). There are 13 items, tapping the following major areas of functioning: (1) interpersonal relations; (2) broad psychopathological domains; (3) functioning in job or school; and (4) use of leisure time. Each item is scored on a range from 0 (no problem) to 4 (a very bad problem). Bird *et al.* (1993) showed in a previous analysis of the MECA data that this instrument has satisfactory validity and reliability.

2.2.2 Sub-study 2

Mental health services use

Participants were defined as having received mental health services if their parents reported that they had seen a psychiatrist, psychologist, social worker, or counselor in the previous 6 months for emotional or behaviour problems, or for the use of alcohol or drugs. There was no independent verification of this report of service use. Mental health services provided by other professionals such as paediatricians and primary health care providers were not included. No data were available regarding referrals to mental health providers that were not followed up by the youth and/or parent.

Need categories

Four categories of need were created: (a) *No Need* - no DISC diagnosis or any DISC diagnosis without impairment *and* no mental health service use in the previous six months; (b) *Overprovision* - no DISC diagnosis or any DISC diagnosis without impairment *and* mental health service use in the previous six months; (c) *Met Need* - any DISC diagnosis with impairment *and* mental health service use in the previous six months; and (d) *Unmet Need* - any DISC diagnosis with impairment *and* no mental health service use in the previous six months.

Economic factors

Family income was assessed according to whether the family was receiving public assistance or not. Access to health insurance was obtained from the parent's answer to a question about whether the youth was currently covered by any type of health insurance, including Blue Cross, Medicaid, Medicare, or any other type of insurance.

Family characteristics

Family History Epidemiologic (FHE) (Lish *et al.*, 1995) was used to assess family psychiatric history. The parent's report of specific psychiatric symptoms in either biological parent indicated a positive history of psychopathology. Maternal educational level was assessed by whether the mother had received a high-school diploma (obtained after 12 years of schooling). Family structure referred to whether or not the parent currently had a spouse. However, this information is lacking for the 42 (18.0%) parents who were not the youth's primary caretaker.

Academic factors

This was assessed by school grades, defined as for Sub-study 1 above.

Perceptions of mental health status and usefulness of mental health services

The parent and the youth were asked to assess the latter's current mental health on a scale ranging from 1 (excellent) to 5 (very poor). They were also asked about their perception of the usefulness of professional help for emotional or behavioural problems. For the parents, the following question was asked:

> *People differ a lot in their feelings about professional help for emotional or behavioral problems. If a friend of yours had a child ***'s age who had an emotional or behavioral problem, would you* ***definitely*** *recommend that she/he go for professional help,* ***probably*** *recommend that she/he go for professional help, or* ***definitely not*** *recommend that she/he go for professional help?*

For the youth, the question was phrased in the same manner, except that the second sentence read as follows: *If a friend of your age had a problem like this, would you ....*

Access barriers to mental health services

Both the parent informant and the youth were asked to indicate which factors might serve as barriers to receiving professional help for the youth. If the youth had received professional help for emotional or behaviour problems or for the use of alcohol or drugs in the previous year, they were asked which factors might stop them from receiving such help. If they had seen a professional for the above reasons in the previous year and had attended fewer times than recommended, they were asked to indicate which factors were part of the reason they

stopped treatment or attended on fewer occasions than recommended. If they had been referred for professional help outside of school for emotional or behaviour problems, or for the use of alcohol or drugs, or had been advised to receive such help, but did not go, they were asked to endorse the reasons for this. Finally, if the youth had not been referred for help nor had received any such help, they were asked which factors might cause them to refrain from going for professional help if mental health services were indeed needed.

Psychiatric disorder

This was defined as for Sub-study 1 above, except that a DISC diagnosis was considered to be present if DSM-III-R symptom, onset, and duration criteria only were met. It was not necessary for impairment also to be present.

Impairment.

Impairment was defined to be present in the case of a youth with a DISC diagnosis if the following two conditions were satisfied: (a) the presence of at least two of the three to five diagnosis-specific DISC items indicating personal distress or social or academic difficulties related to the symptoms of each diagnosis; and (b) the youth had a score of ≤ 70 on the Child Global Assessment Scale (CGAS)(Bird *et al.*, 1987; Shaffer *et al.*, 1983, 1996), as assessed by the interviewer of the parent (Bird *et al.*, 1996).

2.2.3 Sub-study 3

Physical abuse

The instrument was developed on the basis of a review of existing instruments and consultation with a wide range of clinicians and researchers with expertise in physical abuse. A previous version of the instrument was tested in a pilot study involving youths drawn from schools and mental health clinics (N = 164). Interviewers elicited comments from the respondents regarding the appropriateness of the language used and provided their own impressions about each item based on the behavior and reactions of the respondents. These data informed decisions regarding the final version of the questionnaire.

Both the youth and the adult informant were asked whether the youth had ever experienced each of several types of physical abuse. Physical abuse was defined to have taken place if either the youth or the adult informant replied affirmatively to any of the following types of physical abuse: hit very hard; beaten or kicked; locked in a room for 5 hours or more with the door locked or told that he or she would not have food for a whole day or longer; hurt by someone so that he or she was bruised, had bones broken, or was severely injured; badly punished in some other way; and (if none of these types of abuse had been experienced) hurt badly by an older person. A stricter definition of physical abuse was also used, which excluded those whose only physical abuse was having been hit very hard on fewer than five occasions.

Current Physical Health

Both the adult informant and the youth were asked to rate the youth's physical health on a scale from 1 (excellent) to 5 (very poor). The mean of these two assessments was used to characterize the physical health of the youths.

Sexual Abuse

A history of sexual abuse was based on an affirmative reply by either informant to questions asking whether the informant had been either touched or kissed by an older person in a manner that made him or her feel uncomfortable, or whether an older person had tricked or forced the informant to engage in sexual activity against his or her will.

Social Competence

Please see Sub-study 1 above. For this sub-study, only social competence (and not instrumental competence) was included. However, both the youth's and parent's assessments were included.

Suicidality

This was regarded as being present for all youths who indicated that they had experienced suicidal ideation or made any suicide attempts in the previous 6 months.

Psychiatric diagnosis

Please see Sub-study 1 for a description of how this was defined. For the present sub-study, only diagnoses obtained by more than 2% of the MECA sample were included.

School Grades; Family Environment; Family Psychiatric History; Perinatal Problems.

Please see Sub-study 1 above.

2.3 Procedure

Prior to any personal contact with families living in the selected housing units, a letter was sent in which the study was described and the importance of their participation emphasized. These points were reinforced by an enumerator who subsequently visited each selected housing unit to identity the participants and make arrangements for the interviews. Interviews were conducted simultaneously with the youth and adult informant in private by trained lay interviewers. After completion of the interviews, both the youth and adult informant received monetary compensation.

Although confidentiality in general was assured, the interviewers informed the respondents that they would report evidence of child abuse. All cases of physical abuse were referred to a mental health clinician; when indicated, referrals for psychological services were made and statutory reporting requirements fulfilled.

2.4 Analysis

All the analyses were carried out on the combined data from the sites.

2.2.1 Sub-study 1

To address the first hypothesis, unadjusted odds ratios (with their 95% confidence intervals) for all possible pairs of risk behaviors were calculated. These models were repeated, adjusting for age, gender, race/ethnicity, and site.

To address the second hypothesis, an equally-weighted summative *index of risk behavior* was developed, including each of the six risk behaviors. The range of scores was 0 to 6, with one index point being given for each risk behavior. There is evidence that such simple information-combining schemes will as a rule work as well as complex schemes and may even work better (Piacentini *et al.*, 1992). The internal consistency (standardized alpha coefficient) and item-total score correlations were calculated.

Mean scores (with their 95% confidence intervals) were calculated for the index and each of the hypothesized correlates. A series of linear regression models was constructed, using the index as dependent variable and (for each model) a hypothesized correlate as independent variable. The models were adjusted for the demographic variables of gender, age,

race/ethnicity, and site. The results are reported as regression coefficients with their associated standard errors and probability levels.

2.4.2 Sub-study 2

The numbers of youth in each need category, and the number of youth with each diagnosis who had unmet need, were calculated. The percentages of each of the potential correlates were also calculated, stratifying by whether there was unmet need or not.

To further investigate the association between unmet need and its hypothesized correlates, a series of logistic regression models was constructed. The dependent variable for each model was the dichotomous variable of unmet need compared to the remaining need categories combined. The independent variable for each model was each hypothesised correlate. Unadjusted odds ratios are provided for each independent variable. In addition, adjusted odds ratios were calculated, in which age, sex, race/ethnicity, and site were entered as covariates. An odds ratio is significant at the 5% level of significance if the 95% confidence interval does not include 1.

2.4.3 Sub-study 3

Prevalence rates of each psychiatric diagnosis and suicidality were calculated, stratified by physical abuse status. In addition, mean scores for impairment, social competence, school grades, and receptive language ability were calculated stratified by physical abuse status.

To investigate further the association between physical abuse and its hypothesized psychosocial correlates, we constructed a series of regression models, using the hypothesized psychosocial variables as the dependent variables and physical abuse as an independent variable. Separate models were constructed for each psychosocial variable. All models were adjusted for key demographic variables (gender, age, race/ethnicity, family income, site (New York or Puerto Rico)) and potential confounders (family psychiatric history, perinatal problems, current physical health, and history of sexual abuse). For the dichotomous psychosocial correlates, we developed logistic regression models and report the findings as adjusted odds ratios (ORs) with 95% confidence intervals (CIs). For the remaining correlates, we developed multiple linear regression models and report the results as regression coefficients with the associated standard errors and probability levels. In addition, the multiple linear regression models were rerun, controlling for psychiatric disorder.

Finally, all the above analyses were repeated using the stricter definition of physical abuse (which excluded those whose only physical abuse was having been hit very hard on fewer than five occasions).

3. RESULTS

3.1 Sub-study 1

The unadjusted odds ratios for the relationships between all possible pairs of risk behavior (including suicidality) were significantly greater than 1 (Table 3). These relationships remained significant when adjusting for gender, age, race/ethnicity, and site.

The standardized alpha coefficient for the index of risk behavior was 0.69. The corrected item-total score correlation coefficients were 0.49 for ever having smoked marijuana; 0.51 for becoming drunk in the previous six months; 0.50 for ever had any sexual experience or being sexually active; 0.26 for having been in any serious physical fights where there was punching or kicking in the previous year; 0.24 for having had any suicidal ideation or made any suicidal attempts in the previous six months; and 0.46 for currently smoking more than one cigarette per day.

TABLE 3

Unadjusted odds ratios (with 95% confidence intervals) for the relationships between risk behaviors

	Marijuana	Alcohol	Intercourse	Violence	Suicide
Cigarettes	52.0 (26.4-102.5)	29.9 (15.5-57.7)	28.1 (12.9-61.3)	5.0 (2.7-9.1)	6.6 (3.5-12.5)
Marijuana	-	37.9 (21.2-67.9)	27.7 (14.5-53.1)	3.4 (2.0-5.7)	4.4 (2.5-8.0)
Alcohol		-	23.0 (14.5-36.6)	3.0 (2.0-4.5)	4.3 (2.6-7.0)
Intercourse			-	3.7 (2.7-5.1)	3.4 (2.3-5.2)
Violence				-	2.8 (1.9-4.2)

In addressing the modified version of Hurrelmann's model (Table 4), significant relationships between each of the stressors and the score of risk behavior were documented, when adjusting for gender, age, race/ethnicity and site. Specifically, involvement in risk behavior was positively associated with exposure to each of the following stressors: a larger number of life events; a less accepting family environment; marital discord; marital quarrelling; low school grades; use of both nonphysical and physical discipline; having a single caretaker; being pubertal; and poor physical health. Likewise, there were significant associations between each of the resources and the score on the risk behavior index, when adjusting for gender, age, race/ethnicity and site (Table 4). However, the associations were in the opposite direction. Thus, involvement in risk behavior was negatively associated with the following resources: social and instrumental competence; verbal intelligence; parental monitoring; and higher social class.

Each superordinate diagnostic category (mood disorder, anxiety disorder and disruptive disorder), as well as functional impairment, was associated with involvement in risk behavior (Table 4). For biological predisposition, family psychiatric history was significantly associated with the index while perinatal problems were not (Table 4).

TABLE 4

Means or frequencies of potential correlates and their relationships with the risk behavior index* (N = 1285)

Potential correlates	Mean (M) or %	95% CI	β	Std. Error	p
Stressors					
Life events (M)	3.2	3.0-3.3	0.12	0.16	0.00
Family environment (M)	6.6	6.5-6.7	0.08	0.01	0.00
Marital adjustment (M)	20.8	20.4-21.1	-0.01	0.00	0.01
Marital quarreling (M)	4.3	4.2-4.4	-0.03	0.01	0.00
Nonphysical discipline (M)	2.0	2.0-2.0	0.25	0.04	0.00
Physical discipline (M)	2.2	2.1-2.2	0.35	0.06	0.00
School grades (M)	2.9	2.8-3.0	0.15	0.02	0.00
Single caretaker (%)	22.5	20.2-24.8	0.13	0.07	0.05
Puberty (%)	46.5	43.7-49.2	0.19	0.08	0.01
Physical health (M)	1.6	1.6-1.6	0.21	0.06	0.00

Resources					
Competence:					
(a) social (*M*)	3.7	3.7-3.7	-0.17	0.08	0.04
(b) instrumental (*M*)	3,5	3.5-3.5	-0.45	0.06	0.00
Verbal intelligence (*M*)	5.8	5.7-5.9	-0.05	0.01	0.00
Parental monitoring (*M*)	3.5	3.5-3.5	-0.72	0.07	0.00
Social class (*M*)	3.6	3.5-3.6	0.09	0.03	0.00
Biological predisposition					
Family psychiatric disorder (%)	59.8	57.1-62.6	0.25	0.06	0.00
Perinatal problems (%)	19.6	17.4-21.8	0.05	0.07	0.45
Psychopathology					
Mood disorder (%)	7.9	6.5-9.4	0.95	0.10	0.00
Anxiety disorder (%)	13.0	11.2-14.8	0.70	0.08	0.00
Disruptive disorder(%)	10.3	8.6-11.9	1.10	0.09	0.00
Functional impairment(*M*)	6.5	6.1-6.8	0.04	0.00	0.00

* Adjusted for gender, age, race/ethnicity, and site

3.2 Sub-study 2

Of the total sample, the proportion with unmet need (any DISC diagnosis with impairment and no mental health service use in the previous six months) was 17.1%, compared to the 3.8% who had met need (any DISC diagnosis with impairment but with mental health service) (Table 5). The group with met need represents 18.2% of the 269 children and adolescents who had a DISC diagnosis with impairment. Of the total sample, 76.5% had no need while 2.7% had overprovision.

Neither gender, age, nor being Hispanic (compared to white) were significantly associated with unmet need (Table 6). However, being African American (compared to white) was significantly associated with unmet need. Also, those living in Atlanta and New Haven were significantly more likely to have unmet need than those living in San Juan. However, there was no significant difference in the proportion with unmet need between the Westchester County and San Juan sites.

TABLE 5

Need categories (N = 1,285)

DISC diagnosis	Impairment	Mental health service use in the previous 6 months	Need category	*n*	%
No	Not applicable	No	No need	615	47.9
Yes	No	No	No need	367	28.6
No	Not applicable	Yes	Overprovision	19	1.5
Yes	No	Yes	Overprovision	15	1.2
Yes	Yes	Yes	Met need	49	3.8
Yes	Yes	No	**Unmet need**	220	17.1

TABLE 6

Demographic factors: descriptive data and results of logistic regression analyses ($N = 1285$)

	Unmet need ($n = 220$)		No unmet need ($n = 1,065$)		Unadjusted OR for unmet need (95% confidence interval)
	N	%	*N*	%	
Gender					
• Male	116	52.7	565	53.1	
• Female	104	47.3	500	47.0	1.0 (0.8 - 1.4)
Age					
• oldest tertile	76	34.5	368	34.6	
• middle tertile	58	26.4	371	34.8	0.8 (0.5 - 1.1)
• lowest tertile	86	39.1	326	30.6	1.3 (0.9 - 1.8)
Race/ethnicity					
• white	108	49.1	555	52.1	
• African American	49	22.3	141	13.2	1.8 (1.2 - 2.6)
• Hispanic	47	21.4	314	29.5	0.8 (0.5 - 1.1)
• other	16	7.3	55	5.2	1.5 (0.8 - 2.7)
Site					
• San Juan, PR	62	28.2	237	22.3	
• Atlanta, GA	77	35.0	237	22.3	2.5 (1.5 - 3.9)
• New Haven, CT	51	23.2	309	29.0	3.1 (1.9 - 4.8)
• Westchester County, NY	30	13.6	282	26.5	1.6 (0.9 - 2.5)

After adjusting for selected demographic variables, unmet need was significantly associated with the family being on public assistance, the youth not being covered by health insurance, the presence of parental psychopathology, and poor school grades, but not with whether the parent had a spouse (Table 7). In addition, unmet need was significantly associated with the reports of both the parent and youth that the latter had poor mental health. However, beliefs of either informant about the effectiveness of professional mental health services were not significantly associated with unmet need (Table 8).

In contrast to their parents, youth with unmet need for mental health services were not relatively more likely to worry about payment for services, or to think that it would be too difficult to get help (Table 9). Also, the parents of youth with unmet need were relatively more likely to think that the youth would refuse to go; although this item was not asked of the youth themselves, they gave no indication that they harboured a negative attitude to mental health services either in terms of barriers to access or when asked explicitly about their opinion about the usefulness of professional mental health services. Other barriers identified relatively more frequently by parents of youth with unmet need but not by the youth themselves referred to the problem being solved unassisted and being unsure where to go for help.

TABLE 7

Economic, family, and academic factors: descriptive data and results of logistic regression analyses ($N = 1285$)

	Unmet need ($n = 220$)		No unmet need ($n = 1,065$)		Unadjusted OR (95% confidence interval)	Adjusted OR* (95% confidence interval)
	N	%	*N*	%		
Family on public assistance	36	16.4	92	8.6	2.1 (1.4 - 3.1)	2.3 (1.5 - 3.7)
Youth not covered by health insurance	35	15.9	92	8.6	2.0 (1.3 - 3.0)	2.1 (1.4 - 3.4)
Parental psychopathology	161	75.2	573	56.6	2.3 (1.7 - 3.3)	2.2 (1.5 - 3.1)
Mother has high-school diploma	186	84.6	922	86.6	0.8 (0.6 - 1.3)	1.0 (0.6 - 1.5)
Family structure						
• Primary caretaker has a spouse	41	18.6	111	10.4		
• Primary caretaker does not have a spouse	152	69.1	844	79.3	1.4 (0.9 - 2.1)	1.4 (0.9 - 2.2)
• Informant not primary caretaker	27	12.3	110	10.3	2.1 (1.4 - 3.1)	2.1 (1.3 - 3.1)
School grades						
• A's	20	9.7	241	23.4		
• A's - B's	124	59.9	621	60.4	2.4 (1.5 - 3.9)	2.6 (1.6 - 4.3)
• C's - D's	63	30.4	167	16.2	4.5 (2.6 - 7.8)	5.2 (2.9 - 9.3)

* adjusted for sex, age, race/ethnicity, and site

TABLE 8

Perceptions of mental health status and usefulness of mental health services: descriptive data and results of logistic regression analyses ($N = 1285$)

	Unmet need ($n = 220$)		No unmet need ($n = 1,065$)		Unadjusted OR (95% CI)	Adjusted OR* (95% CI)
	N	%	*N*	%		
Parent report						
Opinion of youth's current mental health						
• Excellent	77	35.2	612	57.5		
• good	100	45.7	358	33.6	2.2 (1.6 - 3.0)	2.1 (1.5 - 3.0)
• fair	37	16.9	84	7.9	3.5 (2.2 - 5.4)	3.4 (2.1 - 5.5)
• poor/very poor	5	2.3	11	1.0	3.6 (1.2 - 10.5)	3.3 (1.1 - 10.0)
Opinion of usefulness of professional help for emotional or behavioural problems						
• definitely recommend	155	70.8	765	72.3		
• probably recommend	52	23.7	269	25.4	1.0 (0.7 - 1.3)	0.8 (0.6 - 1.2)
• definitely not recommend	12	5.5	24	2.3	2.5 (1.2 - 5.0)	1.8 (0.9 - 3.9)
Youth report						
Opinion of own current mental health						
• excellent	45	20.6	430	40.8		
• good	108	49.3	519	49.2	2.0 (1.4 - 2.9)	1.7 (1.2 - 2.5)
• fair	59	26.9	99	9.4	5.7 (3.7 - 8.9)	5.1 (3.2 - 8.0)
• poor/very poor	7	3.3	7	0.7	9.6 (3.2 - 28.5)	6.8 (2.2 - 21.0)
Opinion of usefulness of professional help for emotional or behavioural problems						
• definitely recommend	122	56.0	665	63.2		
• probably recommend	87	39.9	359	34.1	1.3 (1.0 - 1.8)	1.2 (0.8 - 1.6)
• definitely not recommend	9	4.1	29	2.8	1.7 (0.8 - 3.7)	1.2 (0.5 - 2.7)

* adjusted for sex, age, race/ethnicity, and site

TABLE 9

Access barriers to mental health services:
descriptive data and results of logistic regression analyses (N = 1,285)

	Unmet need (n = 220)		No unmet need (n = 1,065)		Unadjusted OR (95% confidence interval)	Adjusted OR* (95% confidence interval)
	N	%	*N*	%		
Parent report						
Health insurance not covering this type of treatment	46	20.9	136	12.8	1.8 (1.2 - 2.6)	1.5 (1.0 - 2.2)
Treatment not helping	28	12.7	114	10.7	1.2 (0.8 - 1.9)	1.2 (0.8 - 1.9)
Problem getting better by itself	40	18.2	136	12.8	1.5 (1.0 - 2.2)	1.5 (1.0 - 2.2)
Help being too expensive	53	24.1	201	18.9	1.4 (1.0 - 1.9)	1.3 (0.9 - 1.9)
Concern about what others think	8	3.6	44	4.1	0.9 (0.4 - 1.9)	1.0 (0.4 - 2.3)
Taking too much time/inconvenience	11	5.0	17	1.6	3.2 (1.5 - 7.0)	3.7 (1.6 - 8.3)
Youth wanting to solve the problem on their own	60	27.3	179	16.8	1.9 (1.3 - 2.6)	1.8 (1.3 - 2.6)
Language problem	7	3.2	38	3.6	0.8 (0.4 - 2.0)	0.9 (0.4 - 2.0)
Concern about being hospitalised or taken away against parents' will	52	23.6	196	18.4	1.4 (1.0 - 1.9)	1.5 (1.1 - 2.2)
Youth refusing to go	67	30.5	205	19.3	1.8 (1.3 - 2.5)	1.9 (1.3 - 2.6)
Not trusting mental health professionals	18	8.2	63	5.9	1.4 (0.8 - 2.4)	1.4 (0.8 - 2.4)
Family members objecting	16	7.3	75	7.0	1.0 (0.6 - 1.8)	1.1 (0.6 - 1.9)
Staff being unfriendly or disrespectful	14	6.4	58	5.5	1.2 (0.6 - 2.2)	1.1 (0.6 - 1.9)
Transportation problems	18	8.2	50	4.7	1.8 (1.0 - 3.2)	1.7 (1.0 - 3.1)
Child previously not being helped	21	9.6	61	5.7	1.7 (1.0 - 2.9)	1.6 (0.9 - 2.7)
Being unsure about where to go for help	56	25.5	154	14.5	2.0 (1.4 - 2.9)	2.0 (1.4 - 2.9)
Being unable to get an appointment	11	5.0	53	5.0	1.0 (0.5 - 2.0)	1.1 (0.5 - 2.2)

Youth report

Concern about what others (including family and friends) would think	83	37.7	371	34.8	1.1 (0.8 - 1.5)	1.0 (0.7 - 1.4)
Being unsure about where to go or who to ask for help/treatment	56	25.5	220	20.7	1.3 (0.9 - 1.8)	1.2 (0.8 - 1.7)
Worry about paying for the help/treatment	43	19.6	166	15.6	1.3 (0.9 - 1.9)	1.1 (0.8 - 1.7)
Thinking the problem would go away or be solved unassisted	73	33.2	289	27.1	1.3 (1.0 - 1.8)	1.3 (0.9 - 1.8)
Too difficult to get help (for example, being on a waiting list, not being seen without parents' consent, transportation problems)	44	20.0	177	16.6	1.3 (0.9 - 1.8)	1.1 (0.7 - 1.6)

* adjusted for sex, age, race/ethnicity, and site

3.3 Sub-study 3

The numbers and percentages of children and adolescents who reported having experienced each of the types of physical abuse were as follows: hit very hard, 122 (18.3%); beaten or kicked, 27 (4.1%); locked in a room for 5 hours or more or told that they would not have food for a whole day or longer, 19 (2.9%); hurt by someone so that they were bruised, had bones broken, or were severely injured, 15 (2.3%); badly punished in some other way, 23 (3.5%); and hurt badly by an older person, 29 (4.4%). A total of 172 (25.9%) had experienced any physical abuse. Table 10 provides descriptive data for the control variables, stratified by physical status.

The adjusted ORs for the association between physical abuse and any mood disorder, any disruptive disorder, and any anxiety disorder, as well as for many specific diagnoses, were all significantly greater than 1 (Table 11).

In addition, 15 (8.7%; 95% CI: 4.5 to 12.9) of the physically abused children and 19 (3.9%; 95% CI: 2.2 to 5.6) of the children with no history of physical abuse were suicidal. The adjusted OR was 1.8 (95% CI: 0.8 to 3.9), indicating that physical abuse is not significantly associated with being suicidal.

For both the youth and parent informants, there were significant relationships between physical abuse and both global functional impairment and social competence (Table 12). However, this was not the case for school grades and receptive language ability.

TABLE 10

Descriptive data for control variables, stratified by physical abuse status ($N = 665$)

	Physical abuse			
	Present ($n = 172$)		Absent ($n = 493$)	
	Mean or %	95% CI	Mean or %	95% CI
Gender (% female)	57.0	49.6 - 64.4	50.3	45.9 - 54.7
Age (mean years)	13.1	7.9 - 18.3	13.1	8.1 - 18.1
Race/ethnicity				
• Asian	3.5	0.7 - 6.2	1.2	0.2 - 2.2
• White	11.6	6.8 - 16.4	8.7	6.2 - 11.2
• Hispanic	62.8	55.6 - 70.0	47.3	42.9 - 51.7
• African-American	20.3	14.3 - 26.4	38.9	34.6 - 43.2
• Other	1.7	0.0 - 3.7	3.8	2.2 - 5.6
Family income (mean 1,000$)	14.6	0.0 - 100+	18.5	1.1 - 100+
Site (%)				
• New York	43.0	35.6 - 50.4	57.4	53.0 - 61.8
• Puerto Rico	57.0	49.6 - 64.4	42.6	38.2 - 47.0
Family environment (mean)	7.0	2.1 - 12.0	6.2	2.7 - 9.7
Family psychiatric history (% positive)	53.9	46.3 - 61.5	49.5	45.1 - 54.0
Perinatal problems (% positive)	26.2	19.6 - 32.7	20.9	17.3 - 24.5
Current physical health (mean)	2.1	0.6 - 3.5	1.9	0.7 - 3.2
Sexual abuse (%)	5.8	2.3 - 9.3	2.8	1.4 - 4.3

TABLE 11

Prevalence of current psychiatric diagnosis, stratified by physical abuse status, and adjusted odds ratios for current psychiatric diagnosis ($N = 665$)

	Physical abuse							
	Present ($n = 172$)			Absent ($n = 493$)				
Diagnosis	No.	%	95% CI	No.	%	95% CI	OR*	95% CI
Mood disorders								
• Any mood disorder	17	9.9	5.4 - 14.3	15	3.0	1.5 - 4.6	2.9	1.3 - 6.7
• Major depression	15	8.7	4.5 - 12.9	12	2.4	1.1 - 3.8	3.7	1.5 - 9.1
• Dysthymia	9	5.2	1.9 - 8.6	7	1.4	0.4 - 2.5	2.8	0.9 - 8.8
Disruptive disorders								
• Any disruptive disorder	22	12.8	7.8 - 17.8	16	3.3	1.7 - 4.8	4.3	2.0 - 9.0
• Attention-deficit hyperactivity dis.	5	2.9	0.4 - 5.4	5	1.0	0.1 - 1.9	3.0	0.7 - 12.5
• Conduct disorder	11	6.4	2.7 - 10.1	6	1.2	0.2 - 2.2	4.3	1.8 - 10.3
• Oppositional defiant disorder	16	9.3	5.0 - 13.6	11	2.2	0.9 - 3.5	3.9	1.3 - 11.4
Anxiety disorders								
• Any anxiety disorder	32	18.6	12.8 - 24.4	37	7.5	5.2 - 9.8	2.3	1.3 - 4.0
• Social phobia	10	5.8	2.3 - 9.3	19	3.9	2.2 - 5.6	1.0	0.4 - 2.5
• Simple phobia	7	4.1	1.1 - 7.0	8	1.6	0.5 - 2.7	1.7	0.5 - 5.5
• Agoraphobia	15	8.7	4.5 - 12.9	7	1.4	0.4 - 2.5	6.7	2.6 - 17.6
• Separation anxiety	8	4.7	1.5 - 7.8	10	2.0	0.8 - 3.3	1.8	0.6 - 4.9
• Overanxious disorder	15	8.7	4.5 - 12.9	12	2.4	1.1 - 3.8	3.4	1.5 - 7.9
• Generalised anxiety disorder	9	5.2	1.9 - 8.6	6	1.2	0.2 - 2.2	4.6	1.5 - 14.3

* Models are adjusted for gender, age, ethnicity, income, site, family environment, family psychiatric history, perinatal problems, current physical health, and history of sexual abuse

TABLE 12

Means and standard deviations of psychosocial characteristics, stratified by physical abuse status, and results of linear regression analysis of physical abuse with psychosocial characteristics ($N = 665$)

Psychosocial characteristics	Physical abuse						
	Present ($n = 172$)		Absent ($n = 493$)				
	Mean	Standard Deviation	Mean	Standard deviation	β	Standard error	P
Impairment							
• Youth informant	8.4	7.5	5.6	6.1	1.85	0.57	.00
• Parent informant	7.0	7.3	4.4	5.9	1.01	0.47	.03
Social competence							
• Youth informant	3.5	0.5	3.7	0.4	-0.12	0.04	.00
• Parent informant	3.6	0.4	3.7	0.3	-0.07	0.03	.02
School grades	3.4	1.8	3.1	1.6	0.03	0.15	.82
Receptive language ability	6.2	2.3	6.1	2.3	0.28	0.19	.13

* Models are adjusted for gender, age, ethnicity, income, site, family environment, family psychiatric history, perinatal problems, current physical health, and history of sexual abuse

When psychiatric diagnosis was entered as an additional control variable in the models reported in Table 12, the findings remained significant ($p < .05$) for both youth and parent informants for impairment and for the youth informant for social competence. For the parent informant for social competence, the finding was no longer significant ($p = .12$).

By the stricter definition of physical abuse (which excluded those whose only physical abuse was having been bit very hard on fewer than five occasions), 112 (16.8%) had a history of physical abuse. This redefinition of physical abuse resulted in a conversion of three variables from significant to nonsignificant ORs: conduct disorder (OR = 1.4; 95% CI: 0.5 to 3.7); oppositional defiant disorder (OR = 2.9; 95% CI: 1.0 to 8.7); and any anxiety disorder (OR = 1.7; 95% CI: 0.9 to 3.2). However, the ORs themselves remained greater than 1.

Chapter 4
Discussion

4. DISCUSSION

4.1 Sub-study 1

The finding that there are significant relationships between the pairs of risk behavior adds to the evidence that there is covariation between risk behaviors in children and adolescents. More importantly, it provides support for generalizing this finding beyond school-based populations. Furthermore, the results support including suicidality in the covariation. There are many possible explanations for the covariation between the risk behaviors (Flisher *et al.*, 1996; Wallace *et al.*, 1997). They may share common etiologies, for example anxiety about social situations (Hurrelmann, 1990); they may reflect interchangeable ways of achieving the same social goals, such as admission to a peer group (Huba *et al.*, 1980); they may be related through intervening variables, for example alcohol intoxication may remove inhibitions to becoming violent; and they may occur together in the social ecology of adolescence, where opportunities present themselves to learn a number of risk behaviors simultaneously (Jessor, 1991).

Whatever the reason(s) for the covariation, the fact that it exists in the present sample implies that it is meaningful to examine the correlates of the cluster of risk behaviors. The index of risk behavior was developed for this purpose. The internal consistency of the index is acceptable and the item-total score correlations are in the optimal range. Not only do these psychometric properties indicate that it can be employed in testing the modified version of

Hurrelmann's theory described above, but they provide additional support for the covariation between risk behaviors in children and adolescents.

Each of the stressors was positively associated with the score on the risk behavior index. Conversely, each of the resources was negatively associated with the index. These findings are consistent with Hurrelmann's synthesis model (Hurrelmann, 1989).

The prediction that perinatal pathology would be associated with the index was not confirmed. The other aspect of biological predisposition, namely family history of psychopathology, was significantly associated with the index, controlling for the demographic variables. However, there are other aspects to biological predisposition besides perinatal pathology and family history of psychopathology, which should be included in future studies.

The significant relationship between psychopathology and the index of risk behavior is consistent with previous findings of an association between psychopathology and individual risk behaviors (Deykin *et al.*, 1987; Flisher, 1999; Kandel and Davies, 1982; Stiffman *et al.*, 1992). However, with these few exceptions, the bulk of existing research involving risk behavior has not addressed its relationship with psychopathology. Replication of the present findings would have implications for prevention of risk behavior, which will receive further attention below.

This is the first report of a significant relationship between functional impairment and risk behavior. Further analyses are necessary to determine whether the significant relationship can be attributed to a subset of the dimensions of functional impairment.

In conclusion, the finding that all but one of the independent variables were significantly associated with the index (when controlling for the demographic variables) indicates that the results are generally consistent with the theoretical model underpinning the analysis.

There are five main limitations of the study. First, it has a cross-sectional design, which necessitates caution in attributing causal explanations for the present associations. Clearly, longitudinal studies could cast light on this issue. Second, data about participation in risk behaviors were based on the youth's account. It is impossible to assess the extent to which such data may be biased. However, there is growing evidence that self-report measures of adolescent risk behavior are indeed reliable and valid (Brener *et al.*, 1995). Third, many important risk behaviours such as use of seat belts, driving when drunk and unsafe sexual behaviour were not included. The reason for this is that these variables were not available in the MECA data set. Fourth, for some variables it was arbitrary as to whether they were included as resources or stressors. For example, poor social competence could have been included as a stressor, instead of good social competence as a resource. Fifth, there are no data as to how the stressors were perceived by the youth. It is possible that in some cases they were not perceived as stressful and it was thus inappropriate to regard them as stressors.

There are some important clinical implications of the study. The covariation of risk behaviors (including suicidality) in children and adolescents in the community implies that the presence

of one risk behavior indicates that other risk behaviors may also be present. Not only can all the risk behaviors have deleterious physical or psychosocial outcomes in their own right, but the probability of adverse outcomes from one risk behavior may be increased by the presence of other risk behaviors. Participation in physical fights, for example, is more likely to result in injury if one is intoxicated.

This makes it particularly necessary for clinicians who detect that a patient is engaging in one risk behavior to inquire specifically about other risk behaviors. Failure to do so may result in crucial missed opportunities to reduce adverse physical or psychosocial effects of risk behavior.

In addition, all but one of the potential correlates were significantly associated with the risk behavior index. Each of these characteristics should thus also serve to raise the possibility that the patient may be engaging in risk behavior.

These considerations are also valid for public health practice. Many existing community- and school-based programmes aimed at reducing involvement in risk behavior have produced disappointing results (Dryfoos, 1990; Shaffer *et al.*, 1988; Wechsler and Weitzman, 1996). The relationships documented in the present study (for example, between the risk behaviors and with psychopathology) may assist in screening to identify those adolescents who are more prone to engage in risk behaviors, who could then be prioritized for intervention. Additional investigations are necessary to select a combination of criteria with optimal sensitivity and specificity. Furthermore, the results indicate that interventions should be comprehensive in that they should not focus on the individual risk behaviors. Other risk

behaviors and aspects such as stressors, resources and psychopathology should not be neglected.

4.2 Sub-study 2

A relatively inclusive definition of mental health service use was employed, namely *any* contact with a psychiatrist, psychologist, social worker or counsellor in the previous six months for emotional or behaviour problems or the use of drugs. It is probable that a substantial proportion of the sample defined as having used mental health services had not received the appropriate type, duration, or intensity of services that are necessary for a child or adolescent with need as defined above. It is thus probable that the proportion with unmet need is even higher than the 17.1% of the total sample calculated using the present definitions (Brewin *et al.*, 1987).

Compared to the other sites, those living in San Juan received relatively low scores on the C-GAS (Bird *et al.*, 1996). This decreases the proportion with unmet need since the C-GAS score is a component of the definition of need (Bird *et al.*, 1996). In Westchester county, this may be counteracted by mental health services being relatively more accessible than at the other sites (Bird *et al.*, 1996).

Data from previous community-based studies have expressed service utilisation in terms of the proportion of children with a diagnosis who received services. The majority of previous studies involving children or adolescents referred to lifetime or annual prevalence of service use (Cohen *et al.*, 1991; Leaf *et al.*, 1996; Offer *et al.*, 1991; Whitaker *et al.*, 1990).

However, the present finding of 18.2% of those with a DISC diagnosis and impairment receiving services in the previous six months is comparable with the 16.1% of children aged 4 to 16 years with a psychiatric disorder who had received mental health or social services in this time period in Ontario, Canada (Offord *et al.*, 1987).

Of the total sample, 6.5% had received mental health services in the previous six months. which comprised those with met need (3.8% of the total sample) and with overprovision (2.7%). Those with overprovision comprised those receiving mental health services either in the absence of a DISC diagnosis or, if a DISC diagnosis was present, in the absence of functional impairment. The proportion with overprovision is considerably less than the 17.1% with unmet need. It is thus obvious that the extent of unmet need would not be substantially reduced by reallocating services from those with overprovision to those with unmet need.

Hoberman (1992) has attributed the high proportion of unmet need for services among children and adolescents to parents' having difficulty in assessing the presence of a psychiatric disorder. However, in the present study unmet need was significantly associated with opinions of both the parents and the youth that the latter had relatively poor mental health, which is not consistent with a lack of insight accounting for the high proportion with unmet need. Furthermore, after controlling for demographic variables, unmet need was *not* associated with a pessimistic perception of the usefulness of professional help for emotional or behavioural problems. However, it is possible that this absence of a significant association can be attributed to difficulties in understanding the question (especially by the younger children).

In contrast to these attitudinal factors, unmet need was associated with several variables that may be correlated with economic disadvantage, namely: (a) being African American; (b) being on public assistance; (c) not being covered by health insurance; (d) perceptions by the parent that services would take too much time or be inconvenient; and (e) transportation problems. The salience of economic factors for access to mental health services has been documented in previous clinic- and community-based studies of children and adolescents (Cohen and Hesselbart, 1993; Costello and Janiszewski, 1990; Hoberman, 1992). Inclusion of additional indicators of economic circumstances such as disposable income may elucidate the mechanisms whereby economic adversity contributes to the existence of unmet need for mental health services. Investigations in other countries are necessary to document the extent to which the present findings are specific to the American scenario.

It is possible that the impact of economic factors will increase in the face of the far-reaching reform in health care financing being implemented in the USA (Iglehart, 1996). There is a thrust to reduce government health care expenditure, which would disproportionately affect mental health care (Inglehart, 1996). In addition, an increasing proportion of mental health services in both the public and private sectors are provided under managed care plans, whose profits are correlated with their success in reducing expenditure on services (Inglehart, 1996).

There were several barriers to receiving mental health services that were reported more frequently by the parents of those with unmet need compared to those in other need categories. However, for barriers as perceived by the children or adolescents themselves, there were no differences between those with unmet need and the rest of the sample. It is probable that there is more than one explanation for these differences between informants.

For developmental reasons, the children or adolescents may not be sufficiently knowledgeable or mature to appreciate some of the practical aspects identified by their parents, such as health insurance not covering the treatment, treatment taking too much time or being inconvenient, and transportation problems. The parents of those with unmet need were more likely to think that the youth would want to solve the problem on their own or would refuse to go, which indicates that they may have underestimated the acceptability of mental health services to their children. Whatever the reason for these differences, they suggest that access might be facilitated by: (a) increasing parental knowledge regarding mental health services; and (b) enabling the children and adolescents to make contact with services independently of their families. Of course, in almost all cases it would be desirable to involve the families in the assessment and intervention processes immediately after the initial contact with mental health services. An accessible venue that enables children or adolescents to initiate contact independently is the school (Dryfoos, 1994a,b).

The relationship between scholastic progress and mental health is reflected in the association of unmet need with low school grades. Not only could this association be ascribed to any of the components contributing to an attribution of unmet need, *viz.* psychopathology, impairment, and service utilisation (Bebbington, 1992; Bebbington *et al.*, 1996), but the causal directionality of the association is impossible to establish with the present data set. However, efforts to address either unmet psychiatric need or unsatisfactory scholastic progress that ignore the other are ill-conceived and likely to be of compromised efficacy (National Commission on the Role of the School and Community in Improving Adolescent Health, 1990).

There are also implications for intervention from the finding that unmet need is associated with parental psychopathology. As for school-related factors, these implications are valid regardless of the mechanism for the relationship. Specifically, clinicians treating adults should be aware of the possibility of unmet need in their children. This would improve the well-being of the adult (through reducing the impact of stressors) and the children.

4.3 Sub-study 3

This study has (1) replicated and extended previous conclusions linking physical abuse with impaired social competence and psychopathology; (2) introduced functional impairment as a further adverse correlate of physical abuse; and (3) provided data that serve to question the generalisability of previous results in that the hypothesized association between physical abuse and suicidality, school grades, and receptive language ability was not demonstrated.

Using data from the MECA study to examine these associations broke new ground by virtue of several methodological strengths, at least some of which are absent in all the previous studies. The sample was a community probability sample and was not drawn from children whose abuse had already been disclosed to a social or psychiatric agency. Also, the sample size is large, it is drawn from two sites, and standardized assessment measures were used (such as the DISC). Finally, there was statistical control for several potential confounding variables, not all of which were controlled in any of the previous studies.

However, some aspects of the methodology were sub-optimal. There were relatively small

proportions of abused and non-abused youths who obtained certain diagnoses or had been suicidal, reducing statistical power to obtain significant findings. The study was cross-sectional, impeding speculation regarding the causal nature and timing of the relationships. Although a wide range of diagnoses was included, there are no data regarding other potentially relevant diagnoses either because of their low prevalence in the MECA sample (for example, psychoactive substance use disorders) or their not being included in the DISC-2.3 (for example, post-traumatic stress disorder). The validity of the youths' summary of their grades and of the responses of either informant to the questionnaire items regarding sexual and physical abuse has not been established. In addition, for sexual abuse, a wide range of experiences were included. However, for physical abuse the items do have face validity and the present results provide some evidence of construct validity.

The adjusted ORs for the relationships between each diagnosis except social phobia and physical abuse were greater than 1, indicating that there is a trend for the presence of these diagnoses to be associated with a history of physical abuse. The adjusted ORs were significantly greater than 1 for any mood, any disruptive, and any anxiety disorders, and for many of the specific diagnoses. Most of these findings remained significant when we used the stricter definition of physical abuse.

This study confirms that physical abuse is associated with a *wide range of* psychopathology in a *non-referred population* of children and adolescents. It extends the number of diagnoses associated with physical abuse beyond those reported by Famularo *et al.* (1992) for children whose physical abuse had been legally or administratively recognized. The results confirm that there is not one specific syndrome or diagnosis that is uniquely associated with physical

abuse (Cicehecti and Toth, 1995).

Even though major depression was significantly associated with physical abuse, those who had been abused were not significantly more likely to be suicidal. This is consistent with the finding of Spirito *et al.* (1987) that adolescents hospitalized after a suicide attempt were not more likely to have history of physical abuse than adolescent inpatients referred for psychiatric evaluation. The significant relationships documented else- where (Bensley *et al.*, 1999; Deykin *et al.*, 1985; Finzi *et al.*, 2001; Shaunesey *et al.*, 1993; Stone, 1993) may be attributable to the absence of community probability samples and/or the presence of confounding variables.

The significant relationship between physical abuse and functional impairment, as reported by both informants, provides strong evidence that the previously documented deleterious correlates of physical abuse are accompanied by global functional impairment. The robustness of this association is increased by the fact that it remained statistically significant even after we controlled for psychiatric diagnosis.

The significant relationship between physical abuse and both adult and youth report of social competence may contribute to resolving the controversy in the literature regarding the relationship between a history of physical abuse and social competence. The failure of previous studies to confirm this relationship may possibly be ascribed to their methodological limitations, including unrepresentative samples and confounding variables such as family environment (Malinosky-Rummell and Hansen, 1993). However, the fact that in the present study social competence as assessed by the adult informant was no longer significantly.

associated with physical abuse when controlling for psychiatric diagnosis indicates that this association is complicated and requires further investigation.

The relationship between a history of physical abuse and school grades and receptive language ability was not significant. Although the finding for school grades is inconsistent with most previous reports, it is consistent with the conclusions reached for children who had been abused but not neglected, in the study by Eckenrode *et al.* (1993) that had a large sample size, a control group, specification of the type of abuse, and statistical control for key potential confounders. It is possible that the majority of youths classified as physically abused in the present study had been physically abused only and not also neglected. The failure to demonstrate a significant relationship between physical abuse and low school grades in this study generalizes the findings of Eckenrode *et al.* (1993) to a non-referred population.

The present study is unique in that a significant relationship between physical abuse and receptive language ability was not found. Although further investigations are necessary to replicate this conclusion, it does suggest that the consensus from the previous studies is not generalisable in the presence of statistical control for potential confounders and/or to non-referred children. It is possible that high grades in school and receptive language ability serve as protective factors for physically abused children; this may contribute to difficulties in these domains being differentially manifest in physically abused children who have been referred (Perez and Widom, 1994).

There are several important clinical implications of the results from this sub-study. They emphasize the necessity of a comprehensive psychiatric assessment of children who have

been physically abused, and conversely of inquiring about physical abuse in children and adolescents presenting with a diversity of psychiatric disorders. This diversity implies that one form of intervention is unlikely to be indicated for all physically abused children. However, the association between poor social competence and a history of physical abuse indicates that specific interventions aimed at improving social competence should be considered. Finally, one should be cautious in concluding that satisfactory academic performance indicates an absence of adverse outcomes of physical abuse. This has salience not only for assessments of the efficacy of intervention programs but also for decisions regarding the provision of special services in education systems for physically abused children. The practice of denying such services to physically abused children who are able to deal with academic demands is not supported by the present results (Cicchetti *et al.*, 1993).

References

REFERENCES

Allen DM, Tarnowski KJ (1989), Depressive characteristics of physically abused children. *Journal of Abnormal Child Psychology* 17: 1 –11.

American Psychiatric Association (1987), *Diagnostic and Statistical Manual of Mental Disorders, 3rd edition – revised (DSM-III-R)*. Washington, DC: American Psychiatric Association.

Andrews H (1985), The ecology of risk and the geography of intervention: from research to practice for the health and well-being of urban children. *Annals of the Association of American Geographers* 75:375-382.

Andrews JA, Lewinsohn PM (1992), Suicidal attempts among older adolescents: prevalence and co-occurrence with psychiatric disorders. *Journal of the American Academy of Child and Adolescent Psychiatry* 31:655-662.

Angold A, Messer SC, Stangl D, Farmer EM; Costello EJ, Burns B (1998), Perceived Parental Burden and Service Use for Child and Adolescent Psychiatric Disorders. *American Journal of Public Health* 88:75-80.

Barnow S, Lucht M, Freyberger HJ (2001), Influence of punishment, emotional rejection, child abuse, and broken home on aggression in adolescence: an examination of aggressive adolescents in Germany. *Psychopathology* 34:167-173.

Bebbington P, Brewin CR, Marsden L, Lesage A (1996), Measuring the need for psychiatric treatment in the general population: the community version of the MRC Needs for Care Assessment. *Psychological Medicine* 26:229-236.

Bebbington, P. (1992), Assessing the need for psychiatric treatment at the district level: the role of surveys. In *Measuring Mental Health Needs* (ed. G Thornicroft, CR Brewin, J Wing), pp. 99-117. London: Royal College of Psychiatrists.

Bensley LS, Van Eenwyk J, Spieker SJ, Schoder J (1999), Self-report abuse history and adolescent problem behaviors. I. Antisocial and suicidal behaviors. *Journal of Adolescent Health* 24:163-172.

Beiser M, Lancee W, Gotowiec A, Sack W, Redshirt R (1993), Measuring self perceived role competence among First Nations and non Native children. *Canadian Journal of Psychiatry* 38:412-419.

Beiser M, Lancee W, Gotowiec A, Sack W, Redshirt R (1993), Measuring self-perceived role competence among First Nations and non Native children. *Canadian Journal of Psychiatry* 38:412-419.

Bird H, Andrews H, Schwab-Stone M, Goodman S, Dulcan M, Richters J, Rubio-Stipec M, Moore R, Chiang P, Hoven C, Canino G, Fisher P, Gould M (1996), Global measures of impairment for epidemiological and clinical use with children and adolescents. *International Journal of Methods in Psychiatric Research* 6:295-307.

Bird HR, Canino G, Rubio-Stipec M, Ribera J (1987), Further measures of the psychometric properties of the Children's Global Assessment Scale (CGAS). *Archives of General Psychiatry* 44:821-824.

Bird HR, Shaffer D, Fisher P, Gould M, Staghezza B, Chen J, Hoven C (1993), The Columbia Impairment Scale (CIS): pilot findings on a measure of global impairment for children and adolescents. *International Journal of Methods in Psychiatric Research* 3:167-176.

Bird, H. (1996), Epidemiology of childhood disorders in a cross-cultural context. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 37, 35-49.

Bolger KE, Patterson CJ (2001), Developmental pathways from child maltreatment to peer rejection. *Child Development* 72:549-568.

Boney-McCoy S, Finkelhor D (1995), Psychosocial sequelae of violent victimization in a national youth sample. *Journal of Consulting and Clinical Psychology* 63:726-736.

Boney-McCoy S, Finkelhor D (1996), Is youth victimisation related to PTSD and depression after controlling for prior symptoms and family relationships? A longitudinal, prospective study. *Journal of Consulting and Clinical Psychology* 64:1406-1416.

Brener ND, Collins JL, Kann L, Warren CW, Williams BI (1995), Reliability of the Youth Risk Behavior Survey questionnaire. *American Journal of Epidemiology* 141:575-580.

Breslau N (1995), Psychiatric sequelae of low birth weight. *Epidemiological Reviews* 17:96-106

Brewin CR, Wing JK (1993), The MRC Needs for Care Assessment: progress and controversies. *Psychological Medicine* 23:837-841 (editorial).

Brewin CR, Wing JK, Mangen SP, Brugha TS, MacCarthy B (1987), Principles and practice of measuring needs in the long-term mentally ill: the MRC Needs for Care Assessment. *Psychological Medicine* 17:971-981.

Breslau N (1985), Psychiatric disorder in children with physical disabilities. *Journal of the American Academy of Child Psychiatry* 24:87-94.

Brown J, Cohen P, Johnson JG, Smailes EM (2000), Childhood abuse and neglect: specificity of effects on adolescent and young adult depression and suicidality. *Journal of the American Academy of Child and Adolescent Psychiatry* 38:1490-1496.

Canino G, Bird HR, Rubio-Stipec M, Bravo M (1995), Child psychiatric epidemiology: what we have learned and what we need to learn. *International Journal of Methods in Psychiatric Research* 5:79-92.

Chavez EL, Edwards R, Oetting ER (1989), Mexican American and white American school dropouts' drug use, health status, and involvement in violence. *Public Health Reports* 104:594-604.

Cicchetti D, Toth SL (1995), A developmental psychopatholy perspective on child abuse and neglect. *Journal of the American Academy of Child and Adolescent Psychiatry* 34:541-565.

Cicchetti D, Toth SL, Hennessy K (1993), Child maltreatment and school adaptation: problems and promise. In *Child Abuse, Child Development, and Social Policy. Advances in Applied Developmental Psychology* (Vol 8)(ed. D. Cicchetti, SL Toth), pp 301-330. Norwood, NJ: Ablex Publishing Corporation.

Cohen P, Hesselbart CS (1993), Demographic factors in the use of children's mental health services. *American Journal of Public Health* 83:49-52.

Cohen P, Kasen S, Brook JS, Struening EL (1991), Diagnostic predictors of treatment patterns in a cohort of adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* 30:989-993.

Cohen P, Provet AG, Jones M (1996), Prevalence of emotional and behavioral disorders during childhood and adolescence. In *Mental Health Services. A Public Health Perspective* (ed. B. L. Levin and J. Petrila), pp. 193-209. New York: Oxford University Press.

Costello EJ, Farmer EM, Angold A, Burns BJ, Erkanli ASO (1997), Psychiatric disorders among American Indian and white youth in Appalachia: the Great Smoky Mountains Study. *American Journal of Public Health* 87:827-32.

Costello EJ, Janiszewski S (1990), Who gets treated? Factors associated with referral in children with psychiatric disorders. *Acta Psychiatrica Scandinavica* 81:523-529.

Del Vecchio MJ, Smilkstein G, Good BJ, Shaffer T, Arons T (1979), The family Apgar index: a study of construct validity. *Journal of Family Practice* 8:577-582.

Del Vecehio MJ, Smilkstein G, Good BJ, Shaffer T, Arons T (1979), The family Apgar index: a study of construct validity. *Journal of Family Practice* 8:577-582.

Deykin EY, Alpert JJ, McNamarra JJ (1985), A pilot study of the effect of exposure to child abuse or neglect on adolescent suicidal behavior. *American Journal of Psychiatry* 142:1299-1303.

Deykin EY, Levy JC, Wells V (1987), Adolescent depression, alcohol, and drug abuse. *American Journal of Public Health* 77:178-180.

Dodge KA, Bates JE, Pettit GS (1990), Mechanisms in the cycle of violence. *Science* 250:1678-1683.

Donenberg GR, Emerson E, Bryant FB, Wilson H, Weber-Shifrin E (2001), Understanding AIDS-risk behavior among adolescents in psychiatric care: links to psychopathology and peer relationships. *Journal of the American Academy of Child and Adolescent Psychiatry* 40:642-53.

Dryfoos JG (1990), *Adolescents at Risk. Prevalence and Prevention.* New York: Oxford University Press

Dryfoos JG (1994a),*Full-service Schools. A Revolution in Health and Social Services for Children, Youth, and Families*. San Francisco: Jossey-Bass.

Dryfoos JG (1994b),Medical clinics in junior high school: changing the model to meet demands. *Journal of Adolescent Health* 15:549-557.

Dunn LM, Dunn LM (1981), *Peabody Picture Vocabulary Test-Revised.* Circle Pines. MN American Guidance Service

Dunn LM, Dunn LM (1981), *Peabody Picture Vocabulary Test-Revised.* Circle Pines, MN: American Guidance Service.

Dunn LM, Padilla ER, Lugo DE, Dunn LM (1986), *Manual del Examinador para el Test de Vocabulario en Imagenes Peabody: Adaptacion Hispanoamericana.* Circle Pines, MN: American Guidance Service.

Eckenrode J, Laird M, Doris J (1993), School performance and disciplinary problems among abused and neglected children. *Developmental Psychology* 29:53-62.

Eggert LL, Seyl CD, Nicholas LJ (1990), Effects of a school-based prevention program for potential high school dropouts and drug abusers. *International Journal of the Addictions* 25:773-801.

Endicott J, Spitzer R, Fleiss J, Cohen J (1976), The global assessment scale: a procedure for measuring overall severity of psychiatric disturbance. *Archives of General Psychiatry* 33. 766-771.

Famularo R, Kinnscherff R, Fenton T (1992), Psychiatric diagnoses of maltreated children: preliminary findings. *Journal of the American Academy of Child and Adolescent Psychiatry* 31:863-867.

Finzi R, Ram A, Shnit D, Har-Even D, Tyano S, Weizman A (2001), Depressive symptoms and suicidality in physically abused children. *American Journal of Orthopsychiatry* 71:98-107.

Flisher AJ (1999), Mood disorder in suicidal children and adolescents: recent developments. *Journal of Child Psychology and Psychiatry* 40:315-324.

Flisher AJ, Chalton DO (1995), High-school dropouts in a working-class South African community: selected characteristics and risk-taking behaviour. *Journal of Adolescence* 18:105-121.

Flisher AJ, Ziervogel CF, Chalton DO, Leger P, Robertson BA (1996), Risk-taking behaviour of Cape Peninsula high-school students. Evidence for a syndrome of adolescent risk behaviour. *South African Medical Journal* 86:1090-1093.

Friedman, R. M. (1996) Mental health policy for children. In *Mental Health Services. A Public Health Perspective* (ed. B. L. Levin and J. Petrila), pp. 234-248. New York: Oxford University Press.

Fullilove MT, Golden E, Fullilove RE, Lennon R, Porterfield D, Schwarcz, Bolan G (1993), Crack cocaine use and high-risk behaviors among sexually active black adolescents. *Journal of Adolescent Health* 14:295-300.

Garland AF, Besinger BA (1997), Racial/ethnic differences in court referred pathways to mental health services for children in foster care. *Children and Youth Services Review* 19:651-666.

Garrison CZ, McKeown RE, Valois RF, Vincent ML (1993), Aggression, substance use, and suicidal behaviors in high school students. *American Journal of Public Health* 83:179-184.

Good MD, Smilkstein G, Good BJ, Shaffer T, Arons T (1979), The family Apgar indices: a study of construct validity. *Journal of Family Practice* 8:577-582.

Good MD, Smilkstein G, Good BJ, Shaffer T, Arons T (1979), The family Apgar indices: a study of construct validity. *Journal of Family Practice* 8:577-582

Goodman SH, Hoven C, Narrow W, Cohen P, Fielding B, Alegria M, Leaf P, Kandel D, Horowitz S, Bravo M, Moore R, Dulcan MK (1998), Measurement of risk for mental disorders and competence in a psychiatric epidemiologic community survey: The NIMH Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA). *Social Psychiatry and Psychiatric Epidemiology* 33:162-173.

Goodman SH, Lahey BB, Fielding B, Dulcan M, Narrow W, Regier D (1997). Representativeness of clinical samples of youth with mental disorders: a preliminary population-based study. *Journal of Abnormal Psychology* 97:3-14.

Goodyer IM (1990), Family relationships, life events, and childhood psychopathology. *Journal of Child Psychology and Psychiatry* 31:161-192.

Grigoroiu-Servanescu M (1984), Intellectual and emotional development and school adjustment in preterm children at 6 and 7 years of age. *International Journal of Behaviour and Development* 7:307-320.

Hidalgo I, Garrido G, Hernandez M (2000), Health status and risk behavior of adolescents in the north of Madrid, Spain. *Journal of Adolescent Health* 27: 351-60.

Hingson RW, Strunin L, Berlin BM, Heerden T (1990), Beliefs about AIDS, use of alcohol and drugs, and unprotected sex among Massachusetts adolescents. *American Journal of Public Health* 80:295-299

Hoberman HM (1992), Ethnic minority status and adolescent mental health services utilization. *Journal of Mental Health Administration* 19:246-267.

Hoffman-Plotkin D, Twentyman CT (1984), A multimodal assessment of behavioral and cognitive deficits in abused and neglected preschoolers. *Child Development* 55:794-802.

Hornblow AR, Bushnell JA, Wells JE, Joyce PR, Oakley-Brown MA (1990), Christchurch epidemiology study: use of mental health services. *New Zealand Medical Journal* 103:415-417.

Horwitz AV, Widom CS, McLaughlin J, White HR (2001), The impact of childhood abuse and neglect on adult mental health: a prospective study. *Journal of Health and Social Behavior* 42:184-201.

Huba GJ, Wingard JA, Bentler PM (1980), Applications of a theory of drug use to prevention programs. *Journal of Drug Education* 10:25-38.

Hurrelmann K (1989), *Human Development and Health.* Berlin: Springer-Verlag.

Hurrelmann K (1990), Health promotion for adolescents: preventive and corrective strategies against problem behavior. *Journal of Adolescence* 13:231-250.

Iglehart JK (1996), Health policy report. Managed care and mental health. *New England Journal of Medicine* 334:131-135.

Jensen PS, Bloedau L, Davis H (1990), Children at risk: II. Risk factors and clinic utilization. *Journal of the American Academy of Child and Adolescent Psychiatry* 29:804-812.

Jessor R (1991), Risk behavior in adolescence: a psychosocial framework for understanding and action. *Journal of Adolescent Health* 12:597-605.

Jessor R, Jessor SL (1977), *Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth.* New York: Academic Press.

Kandel D, Davies M (1982), Epidemiology of depressive mood in adolescents. *Archives of General Psychiatry* 39:1205-1212.

Kaplan SJ, Labruna V, Pelcovitz D, Salzinger S, Mandel F, Weiner M (1999), Physically abused adolescents: behavior problems, functional impairment, and comparison of

informants' reports. *Pediatrics* 104:43-49.

Kaufman J (1991), Depressive disorders in maltreated children. *Journal of the American Academy of Child and Adolescent Psychiatry* 30:257-265.

Kazdin AE, Moser J, Colbus D, Bell R (1985), Depressive symptoms among physically abused and psychiatrically disturbed children. *Journal of Abnormal Psychology* 94:298-307.

Kinard EM (1995), Mother and teacher assessments of behavior problems in abused children. *Journal of the American Academy of Child and Adolescent Psychiatry* 34:1043-1053.

Kinard EM (1999), Perceived social skills and social competence in maltreated children. *American Journal of Orthopsychiatry* 69:465-481.

King RA, Schwab-Stone M, Flisher AJ, Greenwald S, Kramer R, Goodman SH, Lahey BB, Shaffer D, Gould MS (2001), Psychosocial and Risk Behavior Correlates of Youth Suicidal Attempts and Ideation. *Journal of the American Academy of Child and Adolescent Psychiatry* 40: 837-846.

Knutson JF (1995), Psychological characteristics of maltreated children: putative risk factors and consequences. *Annual Review of Psychology* 46:401-431.

Kolko DJ (1992), Characteristics of child victims of physical violence. Research findings and clinical implications. *Journal of Interpersonal Violence* 7:244-276.

Lahey BB, Flagg EW, Bird HR, Schwab-Stone ME, Canino G, Dulcan MK, Leaf PJ, Davies M, Brogan D, Bourdon K, Horwitz SM, Rubio-Stipec MA, Freeman DH, Lichtman JH, Shaffer D, Goodman SH, Narrow WE, Weissman MM, Kandel DB, Jensen PS, Richters JE, Regier DA (1996), The NIMH Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) Study: background and methodology. *Journal of the American Academy of Child and Adolescent Psychiatry* 35:855-864.

Leaf PJ, Alegria MA, Cohen P, Goodman SH, Horwitz SM, Hoven CW, Narrow WE, Vaden-Kiernan M,.Regier DA (1996), Mental health service use in the community and schools: results from the four community MECA study. *Journal of the American Academy of Child and Adolescent Psychiatry* 35: 889-897.

Levendosky AA, Okun A, Parker JG (1995), Depression and rnattreatment as predictors of social competence and social problem-solving skills in school-age children. *Child Abuse and Neglect* 19:1183-1195.

Lish JD, Weissman MM, Adams PB, Hoven CW, Bird H (1995), Family psychiatric screening instrument for epidemiologic studies: pilot testing and validation. *Psychiatric Research* 57:169-180.

Lish JD, Weissman MM, Adams PB, Hoven CW, Bird H (1995), Family psychiatric screening instrument for epidemiologic studies: pilot testing and validation. *Psychiatry Research* 57, 169-180.

Macfie J, Cicchetti D, Toth SL (2001), The development of dissociation in maltreated preschool-aged children. *Development and Psychopathology* 13:233-254.

Malinosky-Rummell R, Hansen DJ (1993), Long-term consequences of childhood physical abuse. *Psychological Bulletin* 114:68-79.

Manly JT, Cicchetti D, Barnett D (1994), The impact of subtype, frequency, chronicity, and

severity of child maltreatment on social competence and behavior problems. *Developmental Psychopathology* 6:121-143.

McKirnan DJ, Johnson T (1986), Alcohol and drug use among "street" adolescents. *Addictive Behavior* 11:201-205.

National Commission on the Role of the School and Community in Improving Adolescent Health (1990), *Code Blue*. Alexandria, Va: National Association of State Boards of Education.

National Research Council, Panel on Research on Child Abuse and Neglect (1993), *Understanding Child Abuse & Neglect.* Washington, DC: National Academy Press.

Offer D, Howard KI, Schonert KA, Ostrov E (1991), To whom do adolescents turn for help? Differences between disturbed and nondisturbed adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* 30, 623-630.

Offord DR, Boyle MH, Szatmari P, Rae-Grant NI, Links PS, Cadman DT, Byles JA, Crawford JW, Blum HM, Byrne C, Thomas H, Woodward CA (1987), Ontario Child Health Study: II. Six-month prevalence of disorder and rates of service utilization. *Archives of General Psychiatry* 44:832-836.

Orpinas PK, Basen-Engquist K, Grunbaum JA, Parcel GS (1995), The co-morbidity of violence-related behaviors with health-risk behaviors in a population of high school students. *Journal of Adolescent Health* 16:216-225.

Paavilainen E, Astedt-Kurki P, Paunonen-Ilmonen M, Laippala P (2001), Risk factors of child maltreatment within the family: towards a knowledgeable base of family nursing. *International Journal of Nursing Studies* 38:297-303.

Pavuluri MN, Luk S-L, McGee R (1996), Help-seeking for behavior problems by parents of preschool children: a community study. *Journal of the American Academy of Child and Adolescent Psychiatry* 35:215-222.

Perez CM, Widom CS (1994), Childhood victimization and long-term intellectual and academic outcomes. *Child Abuse and Neglect* 18:617-633.

Petersen A, Crockett L, Richards M, Boxer A (1988), A self-report measure of pubertal status: reliability, validity, and initial norms. *Journal of Youth and Adolescence* 17:117-133.

Piacentini JC, Cohen P, Cohen J (1992), Combining discrepant diagnostic information from multiple sources: are complex algorithms better than simple ones? *Journal of Abnormal Child Psychology* 20:51-63.

Pirie PL, Murray DM, Luepker RV (1988), Smoking prevalence in a cohort of adolescents, including absentees, dropouts and transfers. *American Journal of Public Health* 78:176-178.

Raine A, Brennan P, Mednick SA (1994), Birth complications combined with early maternal rejection at age 1 year predispose to violent crime at age 18 years. *Archives of General Psychiatry* 51:984-988.

Salk L, Lipsitt LP, Sturner WQ, Reilly BM, Levat RH (1985), Relationship of maternal and perinatal conditions to eventual adolescent suicide. *Lancet* 1:624-627.

Salzinger S, Feldman RS, Hammer M, Rosario M (1993), The effects of physical abuse on children's social relationships. *Child Development* 64:169-187.

Scerbo AS, Kolko DJ (1995), Child physical abuse and aggression: preliminary findings on the role of internalising problems. *Journal of the American Academy of Child and Adolescent Psychiatry* 34:1060-1066.

Schwab-Stone ME, Shaffer D, Dulcan MK, Jensen PS, Fisher P, Bird H, Goodman SH, Lahey BB, Lichtman JH, Canino G, Rubio-Stipec M, Rae MA (1996). Criterion validity of the NIMH Diagnostic Interview Schedule for Children Version 2.3 (DISC-2.3). *Journal of the American Academy of Child and Adolescent Psychiatry* 35, 878-888.

Shaffer D, Fisher P, Dulcan MK, Davies M, Piacentini J, Schwab-Stone ME, Lahey BB, Bourdon K, Jensen PS, Bird HR, Canino G, Regier DA (1996), The NIMH Diagnostic Interview Schedule for Children Version 2.3 (DISC-2.3): description, acceptability, prevalence rates, and performance in the MECA study. *Journal of the American Academy of Child and Adolescent Psychiatry* 35:865-877.

Shaffer D, Garland A, Gould M, Fisher P, Trautman P (1988), Preventing teenage suicide: a critical review. *Journal of the American Academy of Child and Adolescent Psychiatry* 27:675-687.

Shaffer D, Gould MS, Brasic J, Ambrosini PJ, Fisher P, Bird HR, Aluwahlia S (1983). A children's global assessment scale. *Archives of General Psychiatry* 40:1228-1231.

Shaunesey K, Cohen JL, Plummer B, Berman A (1993), Suicidality in hospitalised adolescents: relationship to prior abuse. *American Journal of Orthopsychiatry* 63:113-119.

Shepherd M, Oppenheim AN, Mitchell S (1966), Childhood behaviour disorders and the child-guidance clinic: an epidemiological study. *Journal of Child Psychology and Psychiatry* 7:39-52.

Shepherd M, Oppenheim B, Mitchell S (1971), *Childhood Behaviour and Mental Health*. London: University of London Press Ltd.

Sieving R, Resnick MD, Bearinger L, Remafedi G, Taylor BA, Harmon B (1997), Cognitive and behavioral predictors of sexually transmitted disease risk behavior among sexually active adolescents. *Archives of Pediatric and Adolescent Medicine* 151:243-51.

Simonoff E, McGuffin P, Gottesman II (1994), Genetic influences on normal and abnormal development. In *Child and Adolescent Psychiatry: Modern Approaches* (3rd ed)(ed. M Rutter, E Taylor, L Herzov), pp 129-151. Oxford: Blackwell Scientific Publications.

Skuse D, Bentovim A (1994), Physical and Emotional Maltreatment. In *Child and Adolescent Psychiatry: Modern Approaches* (3rd ed)(ed. M Rutter, E Taylor, L Herzov), pp 209-229. Oxford: Blackwell Scientific Publications.

Sosin DM, Koepsell TD, Rivara FP, Mercy JA (1995), Fighting as a marker for multiple problem behaviors in adolescents. *Journal of Adolescent Health* 16:209-215.

Spirito A, Stark L, Fristad M, Hart K, Owens-Stively J (1987), Adolescent suicide attempters hospitalized on a pediatric unit. *Journal of Pediatric Psychology* 12:171-189

Stiffman AR, Dore P, Earls F, Cunningham R (1992), The influence of mental health problems on AIDS-related risk behaviors in young adults. *Journal of Nervous and Mental Disease* 180:314-320.

Stone N (1993), Parenral abuse as a precursor to childhood onset depression and suicidality.

Child Psychiatry and Human Development 24:13-24

Sylbing G, Persoon JMG (1985), Cannabis use among youth in the Netherlands. *Bulletin of Narcotics* 37:51-60.

US Bureau of the Census (1994), *Statistical Abstract of the United States*. Washington DC: US Government Printing Office.

Vondra J, Barnett D, Cicchetti D (1989), Perceived and actual competence among maltreated and comparison school children. *Developmental Psychopathology* 1:237-255.

Vondra JI. Barnett D. Cicchetti D (1990), Self-concept. motivation, and competence among preschoolers from maltreating and comparison families. *Child Abuse and Neglect* 14:525-540

Wallace R, Flisher AJ, Fullilove R (1997), Marginalization, information and infection: The correlation of ghetto risk behaviors and the spread of disease to majority populations. *Environment and Planning A* 29:1629-1645.

Walter HJ, Vaughan RD, Armstrong B, Krakoff RY, Maldonado LM, Tiezzi L, McCarthy JF (1995), Sexual, assaultive, and suicidal behaviors among urban minority junior high school students. *Journal of the American Academy of Child and Adolescent Psychiatry* 34:73-80.

Wechsler H, Weitzman ER (1996), Editorial: community solutions ot community problems - preventing adolescent alcohol use. *American Journal of Public Health* 86:923-925.

Whitaker A, Johnson J, Shaffer D, Rapoport JL, Kalikow K, Walsh BT, Davies M, Braiman S, Dolinsky A (1990), Uncommon troubles in young people: prevalence estimates of selected psychiatric disorders in a nonreferred adolescent population. *Archives of General Psychiatry* 47:487-496.

Windle M, Miller-Tutzauer C, Domenico D (1992), Alcohol use, suicidal behavior, and risky activities among adolescents. *Journal of Research on Adolescence* 2:317-330.

Wu P, Hoven CW, Bird HR, Moore RE, Cohen P, Alegria M, Dulcan MK, Goodman SH, Horwitz SM, Lichtman JH, Narrow WE, Rae DS, Regier DA, Roper MT (1999), Depressive and disruptive disorders and mental health service utilization in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* 38:1081-1090.

Wu P, Hoven CW, Cohen P, Liu X, Moore RE, Tiet Q, Okezie N, Wicks J, Bird HR (2001). Factors associated with use of mental health services for depression by children and adolescents. *Psychiatric-Services* 52:189-195.

Zahner GEP, Daskalakis MS (1997), Factors associated with mental health, general health, and school-based service use for child psychopathology. *American Journal of Public Health* 87:1440-1448.

Zastowny TR, Adams EH, Black GS, Lawton KB, Wilder AL (1993), Sociodemographic and attitudinal correlates of alcohol and other drug abuse among children and adolescents: analysis of a large-scale attitude tracking study. *Journal of Psychoactive Drugs* 25:223-237.

Zolotor A, Kotch J, Dufort V, Winsor J, Catellier D, Bou-Saasa I (1999), School performance in a longitudinal cohort of children at risk for maltreatment. *Maternal and Child Health Journal* 3:19-27.